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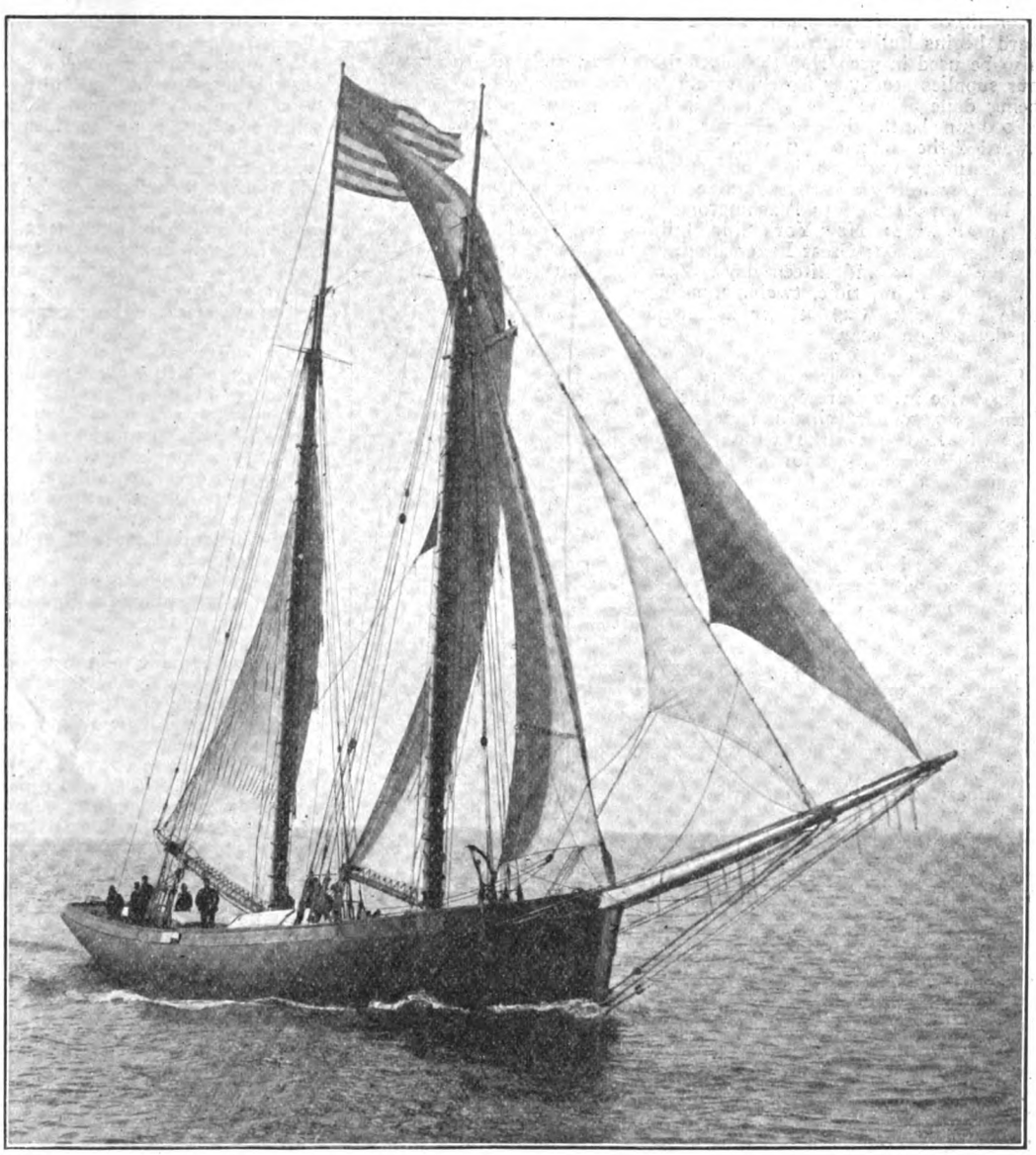
ENLARGEMENT OF ERIE CANAL.

As the ides of November are approaching the opposition to the enlargement of the Erie canal grows on apace. Now the railway journals have taken it up and are discovering meetings which are held to oppose the project. Curiously enough they do not discover the meetings which are held to favor it. Opposition to the expenditure of $101,000,000 is taking rapid and tangible shape in the state, says the Railway Age. It proceeds to say that a strong committee has been appointed to take charge of a campaign against the project. In the campaign of this committee as a substitute for the canal it is proposed to advocate the expenditure of $50,000,000 for good roads. Whenever the people grow restless over the drain of wars it was Napoleon's policy to order fete days observed where, in an excess of pleasure, the people forgot their grievances; and it is a common practice of ruling ministries to divert attention from any domestic design which is calculated to meet with vigorous opposition, by alarming the people over some foreign disturbance. Nothing so cements a people as hostility from foreign sources. This $50,000,000 for good roads is a sop to the farmer. It is cunningly contrived to lead him to imagine that the highway through his farm may be paved at the public's expense. There is no doubt which of these two projects would be of the most benefit to the state at large, says the Railway Age, arguing that the canal at best will benefit only a few people at either end, whereas good roads will contribute to the welfare of the whole state. Good roads are, of course, desirable, but their influence is eminently local. The Railway Age to the contrary notwithstanding. It is the canal which would benefit the state at large. How can an adequate avenue of transportation for bulk freight be other than a benefit? How can an avenue of transportation which confessedly will lower the rate of freight be anything other than a blessing? Will it not cheapen the cost to the consumer? Will it not enable the farmer to reach his market with less handicap, and will it not permit him to receive the commodities which he consumes at a lower freight cost? All this is admitted. Then why not build the canal?

The Railroad Gazette makes an admission with a reservation. It says that bulk articles can be hauled far cheaper on a lake steamer than by rail, which is the admission; but the reservation is that this would not be true if the vessel owner had first of all to make the lake. We are prepared to admit that if the basin of the great lakes from Duluth to Buffalo had been excavated by the Lake Carriers' Association that the tonnage now traversing it, vast as it is, would have difficulty in meeting the interest on its indebtedness. But the lakes are, like the seven seas, the product of nature. The channels of the great lakes, however, are not the product of nature. Originally they were of less than 10 ft. draught and doubtless the harbors had little more than 2 or 3 ft. draught in them. A generous government has made the great lakes navigable to the present type of carrier and the advantage of it is evident. Nowhere in the world are transportation charges so low. Notwithstanding the fact that the iron ore deposits lie a thousand miles and more from the furnaces, they can be assembled at the furnaces at a lower cost than is possible in more favored countries where the ore, coal and limestone practically come out of the same belt. Deep draught alone has made this possible. When there was only a 10-ft. channel in the lakes the freight on a ton of ore was $3, and during the fall months it occasionally advanced to $4 and $6. Now the common rate is 80 cents a ton and it has in special instances been as low as 50 cents. These are facts, the force of which it would be useless to dispute. What is desired to be done is merely to carry this same process to the Erie canal, to give to it an adequate draught in order that the benefit of low freight may be conferred upon the greatest number of people. It is generally admitted that this can best be done by trans-shipment into a 1,000-ton barge at Buffalo. The plan which some have advocated on making a ship canal from the lakes to the ocean is chimerical, and moreover a ship canal of that great length would defeat the very object which it set out to accomplish. It is idle to think that the accepted type of lake carriers, which are yearly growing larger, could navigate a ship canal to advantage. They could not. Their operation through it would of necessity have to be so cautious that the time consumed would eat up the profit in the freight—at any rate it would advance the through rate out of all proportion to the rate which now obtains on the great lakes proper. Dispatch and economy can best be subserved by transferring to a 1,000-ton barge at Buffalo and permitting the lake carrier to return to the upper lakes for its cargo. A type of boat has not yet been designed which can navigate with the highest efficiency



Type of Newfoundland Fishing Smack.

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and economy open seas and sheltered waters. The features which would commend it for the one would defeat it for the other. If the people of New York are wise they will vote this fall for the enlargement of the Erie canal to accommodate barges of 1,000 tons capacity.

PHILADELPHIA SHIP BUILDING NEWS.

Philadelphia, Sept. 9.—The force of draughtsmen at the New York Ship Building Co.'s plant are busy on the plans of the new cruiser Washington. The keel plates of the vessel are ready to be laid and this will be done within a short time. Then the actual construction will be under way. Work on the cruiser is progressing most satisfactorily to the yard officials and the government. The enormous preliminary work necessary before actual work is commenced is little understood outside of ship building circles. The building of the cruiser Washington necessitates the draughting of 1,200 plans, which must be approved by the government. These plans cost from $50,000 to $75,000. Five hundred distinct and separate plans are necessary for the steel plates of the hull. It is estimated that with duplicate drawings over 18,600 sq. ft. of paper will be used on the plans before the yard begins hull construction. Over 10,500 sq. ft. of paper will also be used in preparing the schedules of materials for the various supplies necessary for construction. Preliminary work is also being done at the New York Ship Building Co.'s office on the 16,000-ton battleship, the Kansas, the contract for which was awarded the company June 10 last at $4,170,000.

Saturday Capt. Sanford opened proposals for the building of a steel twin-screw suction dredge for Savannah Harbor, Ga., and forwarded them to Washington for award of contracts. The proposals were: New York Ship Building Co., Camden, time, six months, $214,000; Great Lakes Engineering Works, Detroit, time, twelve months and fifteen days, $206,000; Maryland Steel Co., Sparrow's Point, time, twelve months, $175,000. Amount available for work, $225,000, which includes operating expenses of dredge for one year.

Capt. Sanford, United States engineer, is arranging for the work of removing Schooner Ledge in the Delaware river. The government twice invited proposals for the work, the last bid submitted being $300,000. It being considered too far above the appropriation of $200,000 for the work, the government will now do the work. A plant used for similar work in New York is to be repaired and brought to Philadelphia to do the work.

The congressional committee which recently visited League island has decided that the east end of the island should be raised to the height of 13 ft. above high tide and an appropriation of $300,000 has been asked for the work. Marsh land at the point mentioned will be reclaimed and on the raised part permanent marine barracks will be constructed.

Congress has been asked for a special appropriation for making the wharfage capacity at League island larger than any other naval station in the country. Rear Admiral Sigsbee, referring to the wharfage subject, said that it was one of importance and that he felt sure congress would appropriate money for the purpose.

It is estimated that $5,000,000 will be spent on improvements at Pearl Harbor, Hawaiian islands, in the way of docks, shops, machinery, etc., and a number of Philadelphia firms are looking after contracts—in two cases, it is said, with good results. It is said one firm will furnish an electric lighting plant.

The Brown & Zortman Machine Co. of Pittsburg has opened an exhibit in the machinery department of the Bourse, with R. G. English in charge. The company's business in Philadelphia is increasing. Its boring and other tools have found favor in the ship yards.

The auxiliary cruiser Panther arrived at League island Saturday from Newport News and will have repairs made. She has had a trip breaking in landsmen and also testing her wireless telegraphy equipment, which is said to have given satisfactory service.

The Baldt Steel Co. at New Castle has added another building to its plant. The new addition is being fitted up for additional office rooms and as a cafe for the employes.

At the Elkton, Md., yards last Saturday a barge 183 ft. in length, with a carrying capacity of 800 tons, was launched for the Southern Transportation Co. of Philadelphia.

The recent severe storms have sent a number of badly damaged vessels into the local ship yards and as a result there is plenty of repair work.

The battleship Maine is still lying at Cramps' ship yards and it is yet a little uncertain when she will go on her trip to test her new boilers, etc.

WORK AT MARYLAND STEEL CO.'S YARD.

A trip through the yard of the marine department of the Maryland Steel Co. at this time reveals a scene of considerable activity. Under the shear legs the big Atlantic Transport liner Missouri is taking on her machinery. Just ahead is the railway tug Crisfield getting her motive power. Across the pier is the big New York dredge Mills getting an additional boiler, and opposite to her at the next pier is the Thomas on the same mission. Next is the Missouri's sister Maine, all ready for her 11,000 tons of rails, corn or tobacco or whatever the Americans have to send to foreign shores. The Philadelphia & Reading tug Conestoga is being plated up. The quartermaster's steamer is in frame, keels are laid for the dredges being built for the United States government to use in New York harbor and blocks are ready for the keels of the two dredges that are designed for work on the great lakes. Contract was awarded this company last week for a tug for the Pennsylvania railroad. While this tug is only 111 ft. on the water line it has two triple engines and a large boiler, intended probably for shallow river work. As announced elsewhere in this issue at the opening of the bids last Saturday for government dredge for Savannah harbor this company was the lowest bidder and will in all probability get the contract. This dredge is a duplicate of those building for the lakes except in having a tank under the machinery and surface condenser instead of jet.

The basin in which the floating dry dock for Cavite station is to be built has been pumped out and is about ready to receive the initial plates. There are no keel plates. Considerable material is coming in and punching is being done on it.

NAVAL EXHIBIT AT WORLD'S FAIR.

Mr. B. F. Peters, chief clerk of the navy department, having charge of the department's exhibit at the world's fair, St. Louis, has formulated plans for his exhibit which will make it undoubtedly the most noted and novel in the history of government participation in expositions. The department as a whole has an exceptional opportunity to contribute to the greatness of the exposition. By its unsurpassed exhibit in the government building, the detail of a battalion of marines in their model camp on the exposition grounds and the proposed detail of a squadron of men-of-war at St. Louis when the exposition opens, this department will add more to the success of the exposition possibly than any other. The new features which Mr. Peters will have in his exhibit will render it intensely interesting.

The most important feature of the exhibit will be an exact sized model of an American man-of-war, showing that portion of the vessel from the bow back a distance of 115 ft. to about the first smokestack. The model will not be a reproduction of any particular type of ship, but will contain features peculiar to battleships, cruisers and gunboats. Both the upper and main decks will be shown. On the former will be two 10-in. breech-loading rifles in modern-balanced turrets. The main deck will show the captain's office, staterooms, mess rooms, petty officers' quarters, berths, baths, hammocks, galley, mess dispensary, ammunition hoists, torpedoes, electric watertight doors in operation and naval guns of different calibers.

This model will occupy the central portion of the naval exhibit and will be free of access to visitors, who thus will be enabled to examine carefully and at a close range a modern American warship.

Next in importance to the model will be the exhibition hourly while the government building is open of biograph motion scenes illustrative of the life and duties of the crews on United States naval vessels.

These moving pictures will be thrown on a 20-ft. canvas, and were taken during the summer maneuvers of the North Atlantic squadron off the coast of New England. The scenes reproduced show the maneuvers of vessels, great gun exercises, landing parties, boat races, fire quarters and general muster.

In addition to these radical changes in his former plans, Mr. Peters will exhibit an exact model of the new naval academy at Annapolis in miniature, showing in detail the buildings and grounds (as they will be when completed), for which congress has appropriated $10,000,000.

Other features of the naval exhibit will include about thirty models of United States naval vessels, battleships, cruisers, gunboats, torpedo boats, torpedo boat destroyers, etc., similar to those now on exhibition in the navy department in this city.

Separate exhibits from the different department bureaus, such as the division of supplies and accounts, construction and repair, navigation, equipment and ordnance, will be arranged. In addition there will be numerous features of great interest, which have been outlined heretofore.

In order properly to guard the naval section, and for the purpose of daily drills, a battalion of 200 marines will be detailed for duty on the exposition grounds. Their camp will serve as a perfect exhibit of a modern marine camp.

A bulletin from the bureau of statistics, department of commerce, notes a marked increase in the total movement of freight of all kinds on the great lakes thus far this season. The bulletin says: "Trade on the great lakes between domestic ports to the end of July has exceeded the quantity of freight handled to that date in 1902 by more than a million tons. In July, 1901, there were reported 7,004,685 net tons of freight, against 7,582,848 net tons in 1902, and 7,876,410 net tons in 1903. For the first seven months of the current year 26,928,513 tons of coastwise traffic were reported, compared with 25,718,825 tons last year and 18,801,257 tons in the preceding year, in which navigation opened unusually late. The amount of registered tonnage arriving on the great lakes in coastwise freight for the season to July 31, 1902, was 35,080,876 net tons, and 35,870,685 net tons in 1903. It will thus be noted that capacity of the vessels is increasing on a larger scale than registered tonnage."

The Baltimore Marine Railway, Machine & Boiler Works, which recently went into the hands of a receiver, has been purchased by Mr. E. I. Codd and will hereafter be known as the Marine Railway, Machine & Boiler Works. The plant has been reopened with a new force of mechanics throughout.

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ESTIMATE OF IMPROVEMENTS AT NAVY YARDS.

Rear Admiral Mordecai T. Endicott, chief of the bureau of yards and docks, has received from the commandants of the various navy yards estimates of the cost of improvements recommended to be undertaken at the various yards during the fiscal year ending June 30, 1905. The aggregate of the sums needed approximate $20,000,000. Capt. George F. F. Wilde, commandant of the Boston navy yard, estimates for $1,227,867.89. He recommends improvement of the streets and sewerage system in the yard, and also that extensive paving be done, the roads being now in a wretched condition. He says that the work on the body of dry dock 32 is progressing at such a rate that its completion may be expected before December, 1903. Capt. Pigman, who commands the receiving ship Wabash, wants a bath house on shore for the enlisted men, using the bathing spaces on board ship for berthing. A new foundry with modern improvements is recommended by Naval Constructor Snow.

Rear Admiral P. F. Harrington, commandant of the Norfolk navy yard, wants $2,687,483.36. He says that on account of the limited mooring facilities of the yard for ships entering for repairs it is urgently requested that an appropriation be allowed for the purpose of constructing additional slips; also for the construction of a small dry dock about 220 ft. long, with about 15 ft. waterfront, solely for the purpose of docking torpedo boats and small craft, which at present use other dry docks. This will relieve the crowded condition of the docks and also be a greater economy in the docking of small vessels. Torpedo boats are now moored six abreast and colliers three abreast. The channel opposite the entrance to the city docks should be dredged to accommodate vessels of deep draught.

Capt. Thomas Perry, commanding the New York navy yard, asks for $3,267,040, showing that the very large expenditures for additional ships require a corresponding increase of expenditures in navy yards to provide for repairs. He says: "A very large percentage of the work done in navy yards is being done in this yard. In order that this work may be done in the future efficiently, rapidly and economically, it is a matter of necessity that additional improvements be authorized."

Capt. Perry recommends a new commandant's office at a cost of $30,000; a building for yards and docks, $300,000; a complete rearrangement of the water front of the yard, $1,500,000; coal storage and coal handling facilities, $175,000; $203,000 for dry docks; $219,000 for reconstruction and enlarging building No. 33; various other store houses and improvements in the yard are estimated for in the report. It is also recommended that additional land be secured for the yard. Capt. Perry suggests that the portion of land lying west of Washington avenue adjoining the navy yard, which was sold for $1,208,665, be purchased and used for navy yard purposes. The commandant's office is a fine old building in which center many traditions, but it is inconvenient and so near the noise from the building ships that conversation is almost impossible when the windows are open in summer.

Capt. B. F. Tilley, commanding the navy yard, Mare Island, Cal., asks for $1,230,277.14. He states that the improvements most necessary at that yard are: First, deep water; second, lower transportation costs; third, the completion of buildings which have been already begun and for which the original appropriations were not sufficient, and fourth, extension of naval prisons and fire engine houses, extension of yard lighting, heating and drainage systems, additional berth room for vessels in the vicinity of shops, improvement of the channel in Mare Island strait. The recommendations presented last year by Naval Constructor Zahm provided for 400 ft. of runway, with a 400-ft. slip on the south side of it, and piers for berthing vessels, to be located between the entrance to docks 1 and 2.

The captain of the New London, Conn., yard, submits an estimate of $47,837. He says: "It appears with the constantly increasing demands of torpedo boat destroyers and colliers for coal that some arrangement should be made which will result in their receiving and discharging coal at any and all hours of the day and night. The presence of any one of these vessels upon the scene of action is of considerable moment. Colliers when needed at all are badly needed, and it now frequently happens that these vessels and torpedo boats as well are forced to remain at the dock over night because of an absence of light sufficient to complete their respective discharging and loading—the result is the loss of at least 12 hours, during which any collier can go at least 120 miles and a torpedo boat twice that far. In this connection it is recommended that an electric lighting plant of high power be provided for the yard."

Lieut. Com'dr. Hugh Rodman, commander of the naval station at Hawaii, asks for $34,123.25, and Com'dr. Sewell of the naval station, Island of Guam, for $53,075. A total of $27,370 is estimated for the navy yard at Tutuila.

The commandant of the Portsmouth, N. H., navy yard estimates for $3,768,197.24. He recommends the purchase and extension of an independent water supply system at a cost of $400,000; a separate store house for inflammable material is needed. He says: "The present wooden floating dry dock having been in use for fifty years and at the present time being in a poor condition, extensive repairs are necessary and it is proving a very expensive structure to maintain. A recent examination of this structure made by a board of officers disclosed the fact that $30,000 would have to be expended thereon in order that it can be used for a few years to come. The new dry dock will probably be available in 1904, but its great capacity does not make it an economic one for docking small vessels. It is recommended that a steel floating dry dock of 5,000 tons capacity and a draught of 21 ft. be authorized, to be constructed on the site of the present floating dock. A new building for the commandant of the yard is recommended. It is proposed to fill in the old timber basin to provide a site for two building slips.

Capt. Charles J. Barclay, commandant of the Puget Sound yard, wants $4,000,000. He recommends a dry dock of the largest size, with dredging in its vicinity; a new wharf, quarters for officers and an extension of the water, sewer, steam-heating, electric lighting, fire protection, telephone and railway systems. A saw mill is required at this yard to avoid the delay now experienced in getting lumber from the local mills.

It is proposed to establish a combination entrance gate and police station at the new yard, Charleston, S. C., as an architectural feature and to provide quarters for the marines and civilian watchmen. It is recommended that a dispensary be established for the benefit of the workmen now engaged in the construction of the yard. Capt. Edwin Longnecker, commandant of the yard, asks for the immediate construction of seven quarters for officers and certainly quarters for the captain of the yard. Stabling for horses should be provided, as there are no facilities for getting to Charleston and the distances in the yards are great.

At League island a new construction and repair power house is needed, building slips with proper overhead and traveling cranes and a marine railway for hauling out tugs and torpedo boats. A large appropriation is required for the New Orleans naval station to provide additional wharves, an extension of the railroad system, new machinery, etc.

About $3,000,000 can be profitably expended at San Juan, P. R., for the purchase of land, building a masonry dry dock, 90 ft. by 600, with 32 ft. of water over the sill, and the construction of quarters, marine barracks and a hospital. Dredging, sewer work, road work and storehouse construction are also required. The naval constructor at Pensacola recommends the immediate erection of a granite dock suitable for the largest vessels which cannot get into the dock at Havana without removing coal, stores, etc. Inquiry is being made as to the feasibility of establishing a rifle range at Key West. Additional land would be required and with it additional water front could be obtained.

NAVAL TRAINING SHIP.

The United States navy is to construct two vessels for special training service. The first of these is now being built at the navy yard, Portsmouth, N. H. It is to cost abut $50,000. She is to be 108 ft. long between perpendiculars, and 126 ft. long over all, with an extreme beam of 30 ft., and a depth of 10 ft. On a mean draught of 9 ft. 6 in. she will have a displacement of about 350 tons. The vessel will be constructed in general of yellow pine planking and white oak timber, and will be built in form closely analogous to the coasting craft of the New England waters. She will have a poop and a forecastle deck and bulwarks amidships. The spars will be of the best Oregon pine. The vessel will be coppered below the load water line. Accommodation will be provided for the commanding officer and two other officers in the deckhouse built on the poop deck, this house being provided with three state rooms, with the usual fittings. The crew, which will consist of about sixty landsmen and apprentices, will have quarters below the main deck, extending about one-half the length of the vessel. Forward of the crew's space is a space devoted to the stowage of fresh water tanks of about 2,100 gallons capacity. These tanks will be of metal. Forward of the tanks will be placed the chain lockers. The space below the main deck abaft the crew's space, and the space between the main and the poop decks will be fitted up as store-rooms. A deck house forward on the main deck will hold the galleys where all the cooking will be done. On the forecastle deck, a hand capstan will be placed for catting the anchors and warping ship, and below this deck will be fitted a pump-brake windlass. Anchors will be stowed on billboards on the forecastle deck and cat-heads, davits, hawse pipes and other fixtures installed for their proper handling and stowing. The pumping arrangements will consist of two hand deck pumps of standard design placed on the main deck forward and aft, with connections to the bilges and arrangements for discharging overboard and for washing decks by hose attachments. The water tanks will be filled by hose and connections made to the hand pumps in the galleys. The small boats carried will consist of a 24-ft. cutter, a 20-ft. whaleboat, an 18-ft. dinghy, and two balsas. Davits and cradles and all necessary fitting for handling and stowing these boats will be provided. A hand steering gear, on the poop deck, housed within a mahogany box, will be provided for handling the craft. The outfit of sails, will be very complete, and, while simplified to an extreme, will contain all that is necessary to impart instruction and to ensure the efficient handling of the vessel.

The United States Steel Corporation announces that it had decided to make an exhibit at the St. Louis World's Fair in 1904. The magnitude of the exhibit will be better understood by the statement that it is to cover two acres in the mines and metallurgy building. It will be the first great presentation of our iron and steel industries ever made. Just why America has never made a pretentious exhibition of this industry is not known. It has, in the past few years, according to statistics, equalled the combined efforts of Great Britain and Germany in iron and steel manufacture. In the present instance there exists a great opportunity to make it one of the most interesting features of the fair and the public cannot fail to be attracted and instructed by the complete representation of an industry which is one of the successes of these United States.

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SHIP BUILDING AT BALTIMORE.

Baltimore, Sept. 9.—At the present time there is less repair work in progress at the ship yards than has been noticed for years even at this season. It is encouraging to note, however, that considerable new work keeps many employed. There are now in hand and building seven steel steamers for United States orders. Six tugs, equally divided between wood and steel, are being constructed. Two small three-masted schooners take up attention in two yards when other matters are not pushing. Three lighters and other craft in view, also a houseboat, can likewise be classed among the new work engaging the local ship builders.

The Maryland Steel Co. has orders for new vessels that will see it through the next two years. The steel floating dry dock for the United States navy for the Philippine islands is a mammoth piece of work, which will take nearly that time to complete. The order for four large sand suckers for the United States engineers of the type of the Mills and Thomas, built two years ago, a steamer for the United States quartermaster's department, the tug Conestoga for the Philadelphia & Reading railroad, the finishing up of the Atlantic Transport Line steamer Missouri and the tug Crisfield for the New York, Philadelphia & Norfolk railroad give prosperity to the great plant at Sparrow's Point.

William E. Woodall & Co. are busy on hulls for the two large tugboats to be built for Mr. Winfield S. Cahill, president of the James Clark Co. The 95-ft. hull is in frame and planking will soon begin. The 110-ft. boat has been laid down in the mold loft, and the keel and center work are fast being prepared. The three-masted schooner building by the company for stock is being taken care of in the absence of the more important work. It will likely be launched early this fall, as there are numerous inquiries for it by prospective purchasers.

Record work has marked the construction of the lighthouse tenders Ivy and Magnolia, which the Baltimore Ship Building & Dry Dock Co. has in hand for the United States lighthouse department. Both vessels are entirely in hull, decks are laid and the joiner work on the Magnolia is showing visible advancement. The engines and boilers are being pushed forward in the shops. The likelihood is that both tenders will be launched at the same time this fall. They are twin-screw vessels, 175 ft. long, and are duplicates.

Thomas McCosker & Co. will launch this week a covered lighter for the Atlantic Transport Co. which is 85 ft. long, 26 ft. beam and 7 ft. deep. A few days ago the same builders launched an open lighter for the Baker-Whiteley Coal Co. which was 73 ft. long, 23 ft. beam and 6½ ft. deep.

The William Skinner Ship Building & Dry Dock Co. launched on Saturday an 80-ft. derrick lighter for the Baltimore & Ohio railroad's use in New York harbor. The floor and frame for an open lighter for the same company for use in Baltimore harbor have also been laid at this yard.

The Nilson Yacht Building Co. has started the 100-ft. houseboat for Mr. A. C. Whitney, of Morristown, N. J. It will be built under cover of the large yacht house, making it impossible for weather to affect progress on the boat, which is to be ready for delivery next month.

At the yard of the Spedden Ship Building Co. the keel is laid and stem raised for the 110-ft. steel ocean-going tug for the American Towing & Lightering Co. The frames are being bent, and work on the engine and boiler is progressing in the shop.

Charles Rohde & Son have nearly ready for launching a covered lighter for the Atlantic Transport Co. It is 85 ft. long, 26 ft. beam and 7½ ft. deep. The builders expect soon to close an order for several lighters.

J. S. Beacham & Bro. have a small three-masted schooner on the stocks which may be completed this year, but as the work is pushed only for want of repair jobs it may be next year before the vessel takes a plunge.

McCosker & Co. have considerable of the frame ready for the 110-ft. tugboat they will build for the James Clark Co., which is one of three that firm is having constructed in Baltimore ship yards.

SUEZ CANAL TRAFFIC.

A parliamentary report has just been submitted showing the traffic of the Suez canal for 1902. Last year 3,708 vessels, of a net tonnage of 11,248,413 tons, passed through the canal, an increase over the previous year of nine vessels and 424,573 tons, and over 1900 of 267 vessels and 1,510,261 tons. Transit receipts amounted to 103,720,020 francs, and were higher than in any previous year since the opening of the canal, showing an increase of 3,333,623 francs, as compared with 1901. The Suez canal directors remark that "no special reason can be assigned for the increase in the trade through the canal, except that the economical situation of India has recently improved and that there has been an increased activity in the trade with the east."

The number of vessels which passed through the canal was 3,441 in 1900, 3,699 in 1901, and 3,708 in 1902, of which 1,935, 2,075 and 2,165, respectively, carried the British flag. There was an increase last year, compared with 1901, in the tonnage of British vessels, which amounted to 5,605,421 tons in 1900, 6,252,819 tons in 1901, and 6,772,911 tons in 1902. During the same period the tonnage of German vessels has fluctuated from 1,466,391 tons in 1900 to 1,762,624 in 1901, and 1,707,322 tons in 1902. The percentage of British vessels and their net tonnage increased in 1902, being 58.4 per cent. and 60.2 per cent., respectively, as against 56.1 per cent. and 57.8 per cent. in 1901 and 56.2 per cent. and 57.6 per cent. in 1900, while the percentage of German vessels and their net tonnage decreased in 1902, being 12.9 per cent. and 15.2 per cent., respectively, as compared with 13.8 per cent. and 16.3 per cent. in 1901, and 13.4 per cent. and 15.1 per cent. in 1900. The percentage of net tonnage of the other maritime nations using the canal last year remained practically stationary, as compared with 1901.

The 3,708 vessels of a net tonnage of 11,248,413 tons using the canal in 1902 consisted of the following: Merchant vessels, 2,700, of 7,996,514 tons; mail steamers, 822, of 2,864,938 tons; war ships and transports, 122, of 180,831 tons; government chartered vessels, thirty-one, of 141,161 tons; and vessels in ballast, thirty-three, of 64,969 tons. Of the 2,733 merchant vessels and vessels in ballast, of a net tonnage of 8,061,483 tons, passing through the canal, 1,906 ships, of a net tonnage of 5,848,460 tons, were British, being 69.7 per cent. of the number and fully 72.5 per cent. of the tonnage; 332, or 12.2 per cent., were German vessels, whose tonnage was 13.3 per cent. of the whole; France, Holland, Austria-Hungary and Russia combined furnishing a total of 13.2 per cent. of the vessels and 11.5 per cent. of the tonnage of the carrying trade to the east through the Suez canal.

Notwithstanding the increase in the quantity of tonnage, the mean duration of passage for all vessels navigating the canal was reduced to 18 hours 2 minutes in 1902, as compared with 18 hours 41 minutes in the previous year, while the percentage of vessels navigating by night increased from 93.7 per cent. in 1901 to 95.5 per cent. in 1902. The percentage of vessels drawing less than 24 ft. 7 in. was 88.4 in 1902, as against 88.1 in 1901, while that of vessels drawing more than 24 ft. 7 in. was 11.6 in 1902, as compared with 11.9 in 1901. Until the end of the year 1901 the maximum draught allowed for vessels passing through the canal was fixed at 25 ft. 7 in., and 431 vessels drawing more than 24 ft. 7 in. used the canal, as compared with 439 in 1901 and 402 in 1900, representing a percentage of 11.7 in 1900, 11.9 in 1901, and 11.6 in 1902. From Jan. 1, 1902, the maximum draught allowed has been raised to 26 ft. 3 in., and during the year sixty-nine vessels, or 1.9 per cent., took advantage of this improvement. During last year 297 vessels passed through the canal for the first time, of which sixty-one belonged to shipping companies whose vessels regularly use the canal.

The number of troops carried through the canal last year amounted to 84,946, against 136,514 in 1901, being a decrease of 51,568. There was an increase of 8,528 British, 272 American, and 130 Portuguese, against a decrease of 21,597 Russian, 17,677 German, 13,433 Turkish, 6,743 French, 600 Italian, 245 Japanese, and 176 Dutch troops as compared with 1901. The number of civilian passengers amounted to 98,213 in 1902, as against 92,046 in the preceding years, being an increase of 6,167, while the number of pilgrims, emigrants and convicts was 40,499 in 1902, as compared with 41,661 in 1901, or a decrease of 1,162.

GERMAN MERCANTILE MARINE.

Richard Guenther, consul general to Frankfort, in a communication to the state department, says that the number of ships of the German merchant marine of a tonnage of 1,000 tons and more amounted to 946 last year, and has only increased thirty this year, viz., increase in steamers, forty-one; decrease in sailing vessels, eleven. The number of the crews of the whole fleet has, however, increased considerably, being now 56,300 against 50,500 last year. The total tonnage shows a gain of nearly 250,000 tons, as it is the tendency of the times to build ships with the largest practical tonnage.

The names and tonnage of the largest German steamships are: Kaiser Wilhelm II, North German Lloyd Line, 20,000 tons; Deutschland, Hamburg-American Line, 16,502 tons; Kronprinz Wilhelm and Kaiser Wilhelm Der Grosse, both of the North German Lloyd Line, 14,908 and 14,349 tons, respectively; Patria, Pennsylvania, Pretoria, Graf Waldersee, passenger and freight, of the Hamburg-American Line, over 13,000 tons each; Grosser Kurfuerst, North German Lloyd Line, 13,182 tons; Kaiser Friederich, Elbing Co., 12,480 tons; Moltke and Bluecher, Hamburg-American Line, 12,333 tons each.

The steamers between 8,000 and 12,000 tons—eighteen in number (against seventeen last year)—are owned by the North German Lloyd and the Hamburg-American Line, among them Auguste Victoria, Fuerst Bismark, Kiautschou, and Hamburg of the Hamburg-American Line, and Kaiserin Maria Theresia and the steamers of the Barbarossa and Rhein class of the North German Lloyd Line.

The Hamburg-American Line and the North German Lloyd Line own twenty-five steamers (twenty-three in 1902) of from 6,000 to 8,000 tons.

The Hansa Co. of Bremen owns the steamer Drachenfels, of 7,217 tons; the East Africa Line of Hamburg, the two new mail steamers Prinzregent and Feldmarschall, each of about 6,300 tons; and the Hamburg branch of the German-American Petroleum Association owns the Phœbus, of more than 6,000 tons. Seventy-five steamers (against seventy in 1902), owned by various companies, have between 5,000 and 6,000 tons; seventy-two (sixty-one in 1902) are from 4,000 to 5,000 tons; eighty (same as 1902) are from 3,000 to 4,000 tons; and four hundred and sixty-five (four hundred and forty-four in 1902) are between 1,000 and 3,000 tons.

The official speed of the cruiser Cleveland, as made up by the trial board, is 16.405, five one-thousandths of a knot below the mark of 16.50 required by contract. The trial board will recommend the acceptance of the cruiser at a reduction of price sufficient to cover the deficiency of speed.

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NAVIGATION OBSTRUCTED BY WATER HYACINTHS.*

By L. Y. Schermerhorn.

The attention of the national government was directed a few years ago to the obstruction of the navigable waters of Florida and other South Atlantic and Gulf states, by the aquatic plant known as the "water hyacinth," and an examination was ordered by congress to determine the extent of such obstructions, and what action, if any, should be taken to provide against the closing of these navigable waters by the continued growth and spreading of this plant.

Official attention was first directed to this subject in 1895, by the commercial interests of the St. John's river, Florida, and at that date it was stated that the water hyacinth made its appearance in the river about 1892, and that in 1895 it had so filled the river in places as to render navigation very difficult. In 1896 it had obstructed the St. John's river to such an extent that at certain localities it covered the river "from shore to shore in masses, that neither steamboats, schooners, nor any kind of water craft could make their way" through it. On many of the tributaries of the St. John's river water communication has been practically abandoned, and rafting operations have entirely ceased, and in places on the main river it is dangerous to attempt to cross in small craft, even when the opportunity appears favorable.

Subsequently its appearance was noted in other rivers of Florida and the Gulf states, where its rapid development resulted in such an obstruction of navigable waterways as to demand and receive the attention of the national government. During the last few years congress has made substantial appropriations for the purpose of arresting the spread of the plant, and for removing it, if possible, from localities where it had become a barrier to navigation; but so far these efforts have not been eminently successful.

The plant is known to science as the *Eichbornia crassipes,* or *Pontederia crassipes,* and somewhat resembles the common pickerel weed known in the south as *wampee.* In tropical and subtropical America it is a common and widely distributed aquatic plant. The individual flowers are about 1½ in. in diameter, of a lilac-rose color with a yellow spot on the uppermost petal, and are arranged in the form of a spike about 5 in. in length. The leaves are broad, and nearly circular, growing in the form of a large rosette from 1 to 4 ft. above the surface of the water. The stems of the leaves are enlarged near the surface of the water into oval swellings filled with air-cells, which serve the double purpose of adding buoyancy to the plant and strength to the stems. The roots are fibrous and numerous, forming a dense, bushy mass with a central, wire-like stem, from all sides of which feathery filaments project from one-half to an inch in length; the entire root-stem varies from 1 to 2 ft. in length. The plant commonly floats on the surface of the water without its roots being attached to the soil; though in shallow water such an attachment may result; but in these cases the plants do not grow so large as when floating.

The plant is propagated from the seed, and also by runners starting from the crown of leaves just below the water surface; in this manner large masses of the plant grow together, and remain intact as they drift from place to place under the action of the wind or the river current. The plant requires either fresh or brakish water for its growth. Sea water destroys it after a prolonged immersion.

The water hyacinth is probably an exotic, but the history of its introduction into the United States is not well established. It is a native of Venezuela, and it is stated that it was introduced into this country, as an ornamental plant, many years ago; other authorities state that it was imported from Europe about ten years ago and planted in a small pond near Palatka, on the St. John's river from which it escaped into the adjacent river. At the present time its growth seriously threatens the navigation of streams in Florida, Mississippi, Louisiana, and Texas, by the formation of a dense, floating aquatic growth covering waterways so such an extent that even steamboats are unable, at times, to force a passage.

Congress has appropriated about $90,000 for the study of the problem of the eradication of the water hyacinth, and for carrying into effect experiments therefor. The methods which have been tried may be divided into two classes—viz., the use of mechanical means, and the use of chemicals destructive to the plant.

The mechanical means consisted in breaking the packs apart, and loosening them from the shore, with the hope that the river currents would carry the plant away; this has been only partly successful, on account of the opposing effect of the wind and the sluggish currents of the streams. Efforts were made to surround masses with heavy nets, and by the use of tug-boats tow the impounded mass into salt water, but when a heavy strain was placed upon the net, the plants crowded over it, sinking the float-lines so that the plants could not be retained.

Recourse was then had to specially constructed boats with machinery arranged to cut and crush the roots and stems and thereby destroy their further growth. While this method was efficient as far as it went, it was found to be too slow and expensive to be considered practical as a general solution of the problem.

Experiments were then made with the view of destroying the plant by spraying with various acid solutions, with steam, hot water, and with kerosene oil. Beyond killing the tops of the plants, these methods were a failure, since the unimpaired roots quickly restored the leaf growth of the plant.

The idea was suggested of pitting nature against herself, through the introduction of some animal or parasite growth injurious to the plant, but in the light of precedent this was not considered an advisable experiment to undertake. The introduction of the English sparrow into the United States, the rabbit in Australia, and the Australian lady-bug in California, to kill the white scale on orange trees, are notable instances of the danger of such innovations.

Latterly, attention has again been directed to the destruction of the plant by spraying with a cheap compound, the composition of which is not made known. Experiments recently made with this material indicate that one-twelfth of a gallon per square yard was sufficient to thoroughly destroy the plant; the cost of this method is estimated at about one-third of a cent per square yard treated. With a suitable boat fitted with tanks and spraying apparatus, about 40,000 sq. yds. could be sprayed in a day's work, in large fields of the plant. While the problem of the destruction or checking of the water hyacinth is as yet unsolved, the amelioration of the conditions surrounding the subject is more confidently anticipated in the method last described than in any other which has been suggested.

The extent to which this aquatic plant has increased during the last few years is fully realized by the government, and congress, under the conviction that the interests of navigation are deeply involved, has authorized appropriations to secure its extermination by mechanical, chemical, or any other means.

*Read before Engineers' Club, Philadelphia.

DISCUSSION.

Eugene M. Nichols.—I should like to ask Mr. Schermerhorn whether that growth is anything like that in the Nile.

Mr. Schermerhorn.—No, entirely different.

Carl Hering.—Among the methods that Mr. Schermerhorn suggested for exterminating this weed, he did not mention the application of an electrical current. It seems to me that it might be quite feasible to try the electrical method, as we know from experience that plants as well as animals are very readily killed by an electric current when properly applied. If, for instance, an overhead wire of a lighting or trolley circuit is in contact with the limb of a tree, and the insulation has been rubbed off, the limb will very likely die. I have seen many cases of that kind. If the current were passed in the proper direction through this weed, it seems to me that a relatively small amount of electrical energy might suffice to kill a very large quantity of this growth. The current would have to be applied correctly, probably in the direction of the fiber. As an illustration of a similar application, I might mention here that the electric current has been used to kill the weeds that grow between the tracks of a railroad; there was a dynamo and a transformer for raising the voltage, on the locomotive; one pole was attached to a bar held in front of the train just a little above the level of the tracks; the ground was connected to the other pole through the rails. All the weeds that were touched by this bar as the car passed over them, had a momentary current passed through them and were destroyed. The objection was raised that the current would probably be conducted largely through the water. That may be true, but I think it is more likely that the majority of it would be conducted through the stems and even the roots, because they probably have a lower resistance than the water. If one pole of a high voltage transformer, carried on a boat, were connected to the water and the other to a horizontal bar having numerous short, flexible wires attached to it like a comb, and if this comb were trailed over the parts of the plants which project above the water, the current would have to pass through the stems in order to get into the water; it would thus kill the projecting parts, and probably also those that are submerged. The method is so very simple that it seems well worth trying.

The President.—I should like to ask Mr. Schermerhorn whether the southern waters in which the hyacinth grows are sluggish, or whether there is a current.

Mr. Schermerhorn.—The waters are very sluggish indeed. As you understand, the water hyacinth does not attach its roots to the soil. The roots are not bulbous. The plant is kept in its floating condition by air bulbs or globes along the lower leaves which support the plant upon the surface of the water.

Samuel S. Sadtler.—I should think there might be some nitrifying bacteria that aided the roots in taking up the nourishment. Maybe if some antiseptic were put in the water, the object of destroying these plants might be attained without seriously changing the value of the water and taking excessive amounts of chemicals. Sulphate of aluminum might be effective in such a case.

Mr. Hering.—There is still another possible way of exterminating the plant—namely, to find some use for it. Perhaps the stems of this plant have sufficiently strong fibers to be of some use.

F. E. Dodge.—The waters, especially in Florida, have considerable vegetable matter in them. They are pretty nearly coffee color. I can appreciate the water hyacinth in southern waters. These Florida rivers get some of their water from springs which are quite strongly impregnated with sulphuretted hydrogen. Some of these springs are very large. One that I am familiar with on the St. John's river is 30 or 40 ft. in diameter and water enough comes from it to run a mill. They have an undershot wheel and it runs a grist mill.

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GREAT MOVEMENT OF COAL.

Although the shortage in ore shipments in comparison with those of last year is 621,676 gross tons up to this time, the movement of freight through the Sault Ste. Marie canal is in excess of the movement of last year, owing to the unprecedented shipments of coal. Up to Sept. 1 the movement of hard coal was 538,286 tons in excess of that of last year, and that of soft coal 1,097,551 tons in excess of last year, a total of 1,635,837 tons. The increase in the movement of freight of all kinds is 988,780 tons. Complete summaries of the traffic of both canals, American and Canadian, is given below, compiled from official reports:

Movement of Principal Items of Freight to and from Lake Superior.

ITEMS.	To Sept. 1, 1903.	To Sept. 1, 1902.	To Sept. 1, 1901.
Coal, anthracite, net tons	645,894	107,608	389,036
Coal, bituminous, net tons	3,976 210	2,878.659	2.301,981
Iron ore, net tons	14,980,989	15.285.652	10.956,954
Wheat, bushels	27,248,292	32,468 090	15,695.526
Flour, barrels	3.821,120	4,714,970	4,045,491

Report of Freight and Passenger Traffic to and from Lake Superior, from Opening of Navigation to Sept. 1 of Each Year for Three Years Past.

EAST BOUND.

ITEMS.	To Sept. 1, 1903.	To Sept. 1, 1902.	To Sept. 1, 1901.
Copper, net tons	59,269	66,560	50,823
Grain, other than wheat, bushels	11,726,457	4,214,480	7,671,110
Building stone, net tons	8,440	23,132	23,859
Flour, barrels	3,821,090	4,714,835	4.045 311
Iron Ore, net tons	14,980,989	15,285.652	10,956,954
Iron, pig, net tons	8,693	9.232	20,291
Lumber, M. ft. B. M	576,118	672,565	606,304
Silver ore, net tons			
Wheat, bushels	27,248.292	32,468,090	15.695,526
Unclassified freight, net tons	53,185	74,749	34,433
Passengers, number.	23,019	22,813	20,304

WEST BOUND.

Coal, anthracite; net tons	645,894	107,608	389.036
Coal, bituminous, net tons	3,976,210	2,878,659	2,301.981
Flour, barrels	30	135	180
Grain, bushels	1,000	9,577	55,930
Manufactured iron, net tons	88,569	93,126	69,691
Salt, barrels	255,253	295,853	271,438
Unclassified freight, net tons	307,945	352.897	277,090
Passengers, number.	23.195	22,723	22,167

Summary of Total Freight Movement in Tons.

	To Sept. 1, 1903.	To Sept. 1, 1902.	To Sept. 1, 1901.
West bound freight of all kinds, net tons	5.061,873	3,476,102	3,079,734
East bound freight of all kinds, net tons	17,566,297	18,163,288	13,156,275
Total freight, net tons.	22,628,170	21,639,390	16,236,009

	Vessel passages.	Registered tons.
To Sept. 1, 1903	12,321	18.271,363
To Sept. 1, 1902	14,226	19.382.359
To Sept. 1, 1901	11,742	14,141.814

LAKE FREIGHT SITUATION.

The fact that the ore shipments for August are the heaviest in the history of the ore trade for any single month illustrates the ease with which an enormous freight movement may be handled. It also proves that the ore carriers received relatively good dispatch, far better than they got last year when, it is estimated, that 20 per cent. of the tonnage was tied up at the docks. Moreover, during the month wild cargoes were very scarce, so that nearly all the ore was carried in contract vessels. Ore shipments during August were 4,104,211 gross tons, as against 4,078,311 tons in 1902, an increase of 25,900 tons. Both July and August of this year therefore show an increase over the corresponding months of last year, but the deficiency of this year's movement up to Sept. 1, as contrasted with last year's, is 621,676 tons. No one expects this difference to be made up, owing to the fact that furnaces and docks are pretty well supplied, it being generally acknowledged that more ore was brought down last year than was needed; but the fact that this tremendous August movement should have been handled without any strain whatever, with, in fact, vessels knocking about for cargoes, reveals the real capacity of lake equipment to surround any condition that may arise.

Ore shipments to Sept. 1 of this year are 16,429,854 tons, as against 17,051,530 tons to Sept. 1 of last year, a decrease of 621,676 tons. The ports of Duluth, Superior and Two Harbors have exceeded their record of last year, while Ashland, Marquette and Escanaba have fallen behind.

The double holiday occasioned by Labor day did not leave the docks in as bad condition as might have been thought. The car supply being good, the ore carriers got relatively good dispatch. The coal trade took a bit of a brace after the double holiday and a fair supply was to be found on the docks. Little wild tonnage was needed to handle it, however, and even for this the Steel Corporation vessels competed, taking quite a little coal from Ohio ports and some from Buffalo. Ore cargoes are very scarce but rates are holding steady for the reason probably that there is nothing to be gained by cutting them. The grain trade still continues to be the will o' the wisp, but vessel men are hoping that it will have a material side before the month is out.

During the week the Gilchrist Transportation Co. took a contract to deliver 200,000 tons of hard coal at the leading ports but the rate was not given out.

CHICAGO GRAIN REPORT.

Chicago, Sept. 9.—Since last report grain rates have ruled unchanged but fairly steady on basis of 1⅛ cents wheat, 1 cent corn and ⅞ cent to 1 cent oats to Buffalo, Port Huron and Georgian bay. The several vessels, accumulated over the holidays, met with fairly active offering of Buffalo grain, but undoubtedly the above mentioned basis will govern throughout the balance of the week. All water transportation to Montreal, making rates in neighborhood of 3½ cents corn, have the preference on export business as against the usual route via Buffalo and Georgian bay, yet at times there is even a tendency to shade a little from this figure. However, none of the usual canal traders are entering this figuring to any extent.

Of the shipments noted below for the week just closed, all rail lines had some 70,000 bu. wheat, 90,000 bu. corn and 640,000 bu. oats; via lake to Buffalo, 1,500,000 bu. corn and 150,000 bu. oats; Canadian points via lake, some 75,000 bu. wheat, 600,000 bu. corn and 150,000 bu. oats. The shipments, lake and rail, together with stocks of grain, follow:

	Week just closed.	Last week.	Same week last year.
Wheat	141,215	232,645	1,490,493
Corn	2,199,950	2,125,926	330,170
Oats	853,924	1,278,215	1,216,652
Total	3,195,089	3,636,786	3,037,315

	Shipments since Jan. 1, 1903.	Same time last year.
Wheat	13,287,467	23,027,606
Corn	56,334,262	27,968,324
Oats	44,690,229	38,221,755
Rye	323,623	1,772,466
Total	114,635,581	90,990,151

Stocks of grain show some falling off for the week, but they are still vastly in excess of what they were a year ago. The figures are:

	Week just closed.	Last week.	Same week last year.
Wheat	6,303,000	6,138,000	5,768,000
Corn	4,230,000	4,170,000	1,730,000
Oats	4,347,000	5,020,000	2,065,000
Rye	428,000	388,000	94,000
	15,308,000	15,716,000	9,657,000

SITUATION AT HEAD OF THE LAKES.

Duluth, Sept. 9.—Wheat is coming into the head of the lakes very slowly, on account of wet weather. There has been frequent rain since harvest began; but sales of wheat "to arrive" are now large and receipts will be large in a few days. Stocks of wheat at Duluth-Superior increased slightly, of barley considerably, and stocks of flax diminished 300,000 bu. last week. The ore movement continues very large, 2,450,000 gross tons from Minnesota for August, but will close at this end early. That, at least, seems to be the general calculation. Great Northern road's ore business for the year can hardly be larger than last year and will fall 1,500,000 tons short of early estimates. The Steel Corporation roads are shipping very heavily, the Duluth, Mesabi & Northern last month 1,021,500 gross tons. This road, in spite of losing all its Biwabik and vicinity business, and part of its Duluth ore, is increasing and will probably lead for 1903.

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BUILDING STEAMERS UPON BONDS.

A feature of the business of a trust company which has grown up during the past few years is that of a steamship bond. And a very excellent bond it is. Nearly all of the latter-day freighters are built upon bonds. While a government bond pays from 2½ to 3 per cent. a steamship bond pays 5 per cent., and for all practical purposes the security is quite as good. The building of steamers upon bonds is peculiarly a lake practice. It does not, as far as known, obtain on the coast. It owes its inception and development to the fact that lake steamers are nowadays built of steel and are to all intents and purposes of indefinite life. The hull, therefore, is its own security. The same thing cannot be exactly said of the wooden vessel which is probably the reason that no wooden vessels are built upon bonds. As a rule in financing the construction of a steel vessel one-half of the sum needed is supplied in cash and the other half secured upon bonds. In organizing a company, therefore, stock would be issued to the shareholders for half the value of the steamer and a mortgage, covering its entire value, be given to the trust company as security for its loan. But it is not to be supposed that a trust company would advance one-half the sum necessary to build the vessel if the hull was its only security. It would still have to face the risk of loss through collision or storm and if the vessel went down its security would have totally disappeared. The mortgage therefore contains the provision that the vessel is to be fully insured with the trust company as beneficiary. By this means the bondholder is secured from any loss whatever, for, should the vessel founder, the insurance is more than ample to return to him his principal. His interest, moreover, is safeguarded in other ways. The trust company requires to be returned to it quarterly a statement of the earnings and expenses of the vessel in order that it may be known precisely whether the steamer is a well managed property. The mortgage also stipulates how much debt the vessel may contract—and any vessel owner who has a bond-built vessel will declare that the trust company scarcely allows any debt whatever over the bare operating expenses. Thus are the bonds safeguarded again for the vessel is practically compelled to operate upon a cash basis. Additional security also lies in the fact that the bonds are usually made redeemable annually in 10 per cent. lots. Thus if a vessel is bonded for $100,000 for ten years, only $90,000 of the bonds will be outstanding at the end of the first year, and at the end of the fifth year only $50,000; yet the entire vessel and all its insurance remains security for the outstanding $50,000. The bonds, as stated, bear interest at the rate of 5 per cent. per annum. With $100,000 outstanding the vessel would have to pay $5,000 in interest at the end of the first year, and $2,500 in interest at the end of the fifth. It would be a very poor season, indeed, when a modern carrier would be unable to do this. Yet these bonds so far have been sold at par. There's many a county and municipal bond, bearing a lower rate of interest and with a security that certainly cannot be any better, selling at a premium. Probably when this "bonding business," as one of the old-time vessel owners called it, is better known, steamship bonds will also be at a premium.

COLUMBIA IRON WORKS TO BE SOLD.

Apparently the creditors of the Columbia Iron Works of Port Huron have been unable to agree upon any concerted action or to unite upon any definite plan for the reorganization of the company, for no meeting of creditors has been called since the special committee met a week ago. Meanwhile Russ S. Jenks, the assignee, appeared on Sept. 5 before Judge Tappan in the circuit court at Port Huron with a petition authorizing the sale of the property at public auction to the highest bidder. Judge Tappan granted the order and the sale is set for Sept. 18, the property consisting of land, buildings, machinery, tools to be sold in bulk for cash. Various of the creditors are now endeavoring to replevy material furnished to the company prior to its assignment, but doubt is expressed as to whether these suits will hold.

STATEMENT REGARDING THE PITTSBURG.

The side-wheel steamer Pittsburg which was burned at the dock at Sandwich recently was insured for $50,000. Manager W. J. Brown of the Georgian Bay Navigation Co. has issued a statement concerning the causes advanced of the origin of the fire. He says that the underwriters through their inspector placed a valuation of $62,500 upon the Pittsburg and were always ready to write that amount of insurance upon her. She has carried $50,000 of insurance during the past four years. Continuing he says:

"It was necessary to carry $50,000 to secure the lowest rate. On a risk for an amount less than that the rate was advanced considerably higher. The company was obliged to take out policies for that amount or become a co-insurer with the underwriters. In the winter and spring of 1900 at Collingwood the owners spent on the rebuilding of the steamer, and for her outfit and furnishings since that time, over $80,000. If the boat was over-insured, the insurers have the option of rebuilding her and the company would be very much pleased indeed to have them take advantage of that option. She was a steamer with first-class accommodations to sleep 256 people, and her equipment in that department was first-class in every respect. She had plumbing throughout with running water in every state room, and had fully equipped electric light and refrigerating plants. There are not more than five boats running out of Detroit that are better equipped for taking care of their passengers than was the steamer Pittsburg. At the time of the fire she had all of her furniture, carpets and furnishings aboard, which were packed ready to be removed on Monday, together with enough linen to take care of 300 passengers for six days."

Mr. Brown's opinion is that the steamer was burned by persons who were aboard for the purpose of theft, and who, either by accident or design, threw a match among the cotton-felt mattresses which were stacked up in the center of the cabin. He says that he is well informed that silverware and linen marked Pittsburg were offered for sale in Sandwich on the day preceding the fire.

IMPROVEMENT AT STEEL CORPORATION MINES.

Duluth, Sept. 9.—Arrangements are made for the erection at the new "B" shaft, Pioneer mine, Ely, Minn., of a splendid steel shaft house, to be 168 ft. high, to have two compartments and a ladder way. Five-ton skips will be hung and engines to hoist them at the rate of 2,000 ft. a minute are to be provided. This shaft is now 1,068 ft. deep, and two levels are to be opened into ore at once, so that shipments another year will be very large. This shaft was made necessary by the vastly increased tonnage shown in the mine, and by the fact that "A" shaft will some time probably cave near the surface, requiring the same treatment that was given to No. 1 Chandler, close by. "B" shaft is in rock its entire depth, and some distance back from ore, while "A" was sunk by the former owners on the hanging and too close to ore. Two 26 by 60 automatic hoisting engines with 12-ft. direct motion drums supplied from 450 H. P. of tubular boilers will provide power. Engine and boiler houses are under way and the foundations for the shaft house are finished. This mine is hoisting from its single two-compartment shaft 75,000 tons of ore a month, a record that is probably exceeded at very few points. Its shipments for the season to Sept. 1 have been in the neighborhood of 425,000 tons.

The next big steel shaft house to be erected by the Oliver Iron Mining Co. will be at Norrie "A" shaft, which is similar in most respects to that at Pioneer. At Norrie the new shaft is about 900 ft. deep, and is built with steel sets and wood lath, except for the portion above ledge, which is 20 ft. long and is timbered in the customary way. At Pioneer wire rope is used for lath for some distance where the surrounding rocks are dense. "A" Norrie is 6 by 23 ft. inside timbers, carrying four compartments, and is at an incline of 58 degrees. Norrie house will not be as elaborate as at Pioneer or others at Ely.

Head frames of the same general nature will be built at Chappin's new steel-lined shaft that is under construction at Aragon and at Zenith, it being the policy of the Steel Corporation to provide its important deep mines and large producers with equipment to carry on the largest possible business at minimum costs.

COAL SHIPMENTS TO MILWAUKEE.

Milwaukee, Sept. 8.—With a total of 1,362,003 tons of coal received by lake from the opening of navigation to Sept. 1, 1903, Milwaukee has beaten all of its previous records by almost 500,000 tons. The amount of anthracite received during the season was 498,189 tons, of which 149,083 tons arrived in August. Bituminous receipts for the season were 863,814 tons and for August 158,110 tons. Despite these enormous receipts, none of the coal docks of the city are over-supplied, and, especially in anthracite, a large shipment in September will be necessary to fill out the winter supply. The demand this year has been earlier and heavier than in previous seasons, and this accounts for the rapidity with which the coal has left the docks. The comparative figures for the last four years, showing the receipts for the month of August and for the season to Sept. 1 compiled by President W. H. Simpson of the Northwestern Fuel Co. are as follows:

	1900.	1901.	1902.	1903.
ANTHRACITE.				
August	92,229	110,399	none	149,083
To Sept. 1	360,556	358,398	92,475	498,189
BITUMINOUS.				
August	113,861	90,602	175,856	158,110
To Sept. 1	501,954	378,213	781,457	863,814
BOTH KINDS.				
August	206,090	201,001	175,856	307,193
To Sept. 1	862,510	736,611	873,982	1,362,003

As September's receipts are expected to eclipse those of August there seems now to be little doubt that 1903 will prove by far the heaviest year for coal receipts in the port of Milwaukee.

The twin-screw lighthouse tender Juniper, built by the Spedden Ship Building Co., Baltimore, Md., has had her trial and has just left for her post off Long Point, N. C. The Juniper is a steel vessel 100 ft. long, 19 ft. beam and 8 ft. depth of hold. She has twin compound engines of the fore-and-aft type, with cylinders 12 in. square, for which a Roberts water-tube boiler furnishes steam. The apartments for officers and crew are situated in a trunk cabin aft, but will be used only when the vessel is on duty, as quarters are fitted up ashore for all at Long Point, where an apparatus for manufacturing gas is located. In the forward hold of the Juniper there are twenty tanks for carrying gas to be used in filling the gas buoys in the Carolina sounds. They have a capacity for 17,000 cu. ft., and a compressing engine is in the outfit, by means of which the buoys are filled.

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AROUND THE GREAT LAKES.

Mr. W. H. Collins has been installed as assistant inspector of boilers at the Milwaukee office of the government inspection service.

Edmund R. Dungan, a well-known marine engineer, died at his home in Detroit last week. He was born at Precott, Ont., and was thirty-eight years old. He leaves a widow and five children.

The Erie & Buffalo Steamboat Co., which has operated the steamer Pennsylvania between Erie and Buffalo for the past four years, has petitioned the court for a dissolution of the company. The business was not paying.

The amount of freight carried through the Canadian Sault canal during August was the largest in its history, 879,000 tons having been reported. In August of last year but 340,000 tons went through the Canadian Sault locks.

Grace J. has the distinction of being the smallest freighter on the lakes and the first gasoline freight ship ever given attention by the United States inspectors at Chicago. It was built to enter the fruit trade between Chicago and Michigan ports.

The Gilchrist steamer John Craig which was wrecked on Simmon's reef will be sold at public auction at the old Clark dry dock at Detroit today (Thursday). The steamer was insured for $65,000 and was abandoned to the underwriters by Mr. Gilchrist.

It is reported that the great hydraulic lift lock at Peterboro is nearing completion and that it will shortly be possible for vessels drawing 8 ft. of water to navigate the new Trent canal across the province of Ontario, connecting Georgian bay and the St. Lawrence river.

Maj. Lansing H. Beach, lighthouse engineer, has granted a contract to M. Sullivan of Detroit for dredging soft material and rock from the harbor of refuge at Sand Beach. The object of the work is to enlarge the space inside the harbor and make a safe anchorage for storm-bound vessels within the breakwater.

At a meeting of the directors of the Michigan Steamship Co. held at Chicago last week it was proposed to buy or build another steamer to be run in connection with the Eastland between Chicago and South Haven. The new steamer, if built, is to be a general service vessel. The Eastland carries passengers exclusively.

Through an agreement with the Great Lakes Towing Co. and Capt. Frank Hackett competition for towing and wrecking in the vicinity of Amherstburg will be done away with and the latter will have the field to himself. The towing company's tug Peerless will be sent to other fields and Capt. Hackett will use the lighter Newman in his wrecking operations instead of the lighter Hammond.

Another old-time schooner, the La Petite, has been added to the list of those whose hulls are now rotting around the shores of Lake Michigan. The schooner left Fox last Saturday bound for Milwaukee. She was struck by the southeast gale Monday and drifted helplessly until in the afternoon when she was 10 miles from shore, near the Sturgeon bay canal. Signals of distress were sighted by the lookout of the life saving station and the crew of five men were taken ashore by the life savers. The lost vessel was owned by Theodore Plathner of Milwaukee.

Mr. Frank E. Kirby has just returned from a three-months' trip to Europe, where he devoted considerable time to the study of the turbine engine. He was much impressed with the performance of the King Edward, running on the Clyde, and the Queen, running in the cross-channel service between Dover and Calais. In his opinion turbine steamers are eminently successful on straight runs where great speed is required. They are free from vibration and are extremely comfortable sailers. He does not think that they are adaptable to routes with many stops and crooked channels and, therefore, would be of no use on the lakes.

The International Longshoremen, Marine & Transport Workers' Association took another step in their branching out policy this week when a charter was issued to local 526, composed of general longshoremen at Nome City, Alaska. This local, the members of which are paid $1 an hour for their work, was organized July 12 with a membership of 210. The association now has locals in all the American possessions, having recently issued charters to the longshoremen at Honolulu. Cuba, Porto Rico and the West Indies have had locals for some time and the maritime workers at every coast city on the Atlantic and most of those on the Pacific have been unionized. The international is also affiliated with the dock workers of Europe.

Capt. Richard Burns of the schooner Emma L. Coyne was arrested at Cleveland last week on the charge of having abandoned a sailor in a foreign port. James Cunningham, the mate of the boat, swore out the warrant. He had shipped at Cleveland and claims Capt. Burns sailed away from Fort William without him. On the way up the lakes the captain and the mate had a quarrel and at Fort William the captain had the mate arrested for assault and battery. That is the reason the captain gives for not bringing Cunningham back. The federal district attorney at Cleveland heard of the matter through C. D. Jarvis, United States consul at Port Arthur. Capt. Burns was released on $2,000 bail. The maximum penalty for the offense charged is six months' imprisonment and $500 fine. This is the first time this statute, common enough on salt water, was ever invoked on the great lakes.

Judge George P. Wanty of Grand Rapids, who is now holding federal court for the western district of Michigan at Marquette this week, has taken under advisement the case of the United States vs. the steamer Huronic, owned by the Northwestern Steamship Co., charged with violation of the navigation laws. The Huronic, in violation of the law, took nine passengers aboard at Duluth and sold them tickets through to the American Sault, a thing illegal for a boat of foreign registry, the Huronic being Canadian owned. The offense was committed in August of last year. It was investigated and in due season Collector of Customs Smith of this district assessed a fine of $200 for each passenger, making a total of $1,800. The owners of the boat, it appears, were willing to pay the amount, but the department desired an opinion in the case, and it is for this purpose that it was submitted before Judge Wanty. The owners of the Huronic made no appearance and only the United States' side of the proceedings was presented.

George J. Lonstorf of Milwaukee now has an option for lease of the celebrated iron ore property known as Section 30. The Clergues have reluctantly abandoned their option, after spending about $35,000 in explorations since they began drilling for ore there last winter. The Clergues were operating under the name of the Section Thirty Co. and B. J. Clergue was president. The option from the fee owners of the land ran to Francis H. Clergue. Several weeks ago operations on the Section 30 property stopped. It was explained that the only difficulty in the way of continuing the drills was that the crumbling character of the ore made it impossible to ascertain the extent of the ore body. This was true enough, but about that time the Clergues ceased work on the drills and were confronted with the heavy expense of sinking an exploratory shaft, as well as continuing drilling to some extent. The fee owners gave them a fair space of time in which to resume, and, when they did not do so, served notice that their option had expired under the terms of the contract.

STATEMENT FROM CHICAGO PNEUMATIC TOOL CO.

During the past few days a vast amount of gossip has been printed relative to the Chicago Pneumatic Tool Co., the majority of which was entirely without foundation and apparently malicious in nature. The company has therefore issued the following statement in order that the public may be informed as to the correct status of affairs:

"In the first place, President Duntley is not going to resign. It is due to his knowledge, energy and ability that the pneumatic tool business has grown to its present vast proportions. This is fully recognized by the directors and none of them desire his resignation. The report that he does not have the confidence of Mr. Schwab or Mr. Matthiessen is entirely without foundation, and there is no justification in the report that he anticipates retiring or that any stockholders desire him to do so. The fact that Mr. Schwab has purchased from Mr. Pam the stock owned by the latter is true, and this transaction was a private one between them. It originated with them and none of the other officers or stockholders had anything to do with it. Therefore Mr. Pam, having sold all of his stock, it naturally followed that he should resign from the directory, which he has done entirely of his own accord. The above transaction was but one of the many which are continually passing between Mr. Schwab and Mr. Pam, and has no significance whatever. The fact that Mr. Matthiessen is at present in Chicago is true, but he is not examining the accounts or affairs of the company, simply attending to other affairs in which he is interested.

"The executive offices of the company are to be removed to New York, and it is due to this fact that some of the directors have tendered their resignations. Mr. Schwab is the largest stockholder in the company and has expressed a desire to take an active part in the direction of the company's business, as has also Mr. Matthiessen. Their action is entirely justified by their present holdings in the company, and as they both live in New York, it is necessary that the executive offices be located in that city.

"As regards Messrs. Wacker, Chalmers and Lynch, these gentlemen agreed when they accepted places on the board that they would do so only if the executive offices were located in Chicago, as it would be impossible for them to attend meetings in New York city, as they could not take the time from their other affairs. Naturally, therefore, when they learned of the proposed change in location, they were opposed to it, as they felt it impracticable for them to continue on the board and executive committee, and they accordingly tendered their resignations. In all probability the number of directors will be reduced from fifteen to nine, as the members are widely separated and it is difficult to obtain a quorum with the present number.

"The affairs of the company are in a most flourishing condition, and the prospects are exceedingly bright for them to continue so in the future. The various plants are working increased forces in order to adequately fulfill requirements. Their foreign offices report a correspondingly cheerful outlook. The business for the month of August just passed exceeded that transacted in August, 1902, and there is every indication that the present month of September will be very satisfactory as regards sales of pneumatic appliances."

The new light-draught, side-wheel steamer Washington A. Clark, now being built at the ship yard of the Merrill-Stevens Engineering Co., Jacksonville, Fla., will be launched during the latter part of the present month. She is to be used in the cotton business between Charleston and Columbia, S. C. She will have two tandem compound engines with cylinders 12 and 29 in. in diameter with stroke of 72 in., supplied with steam by two Taylor water-tube boilers.

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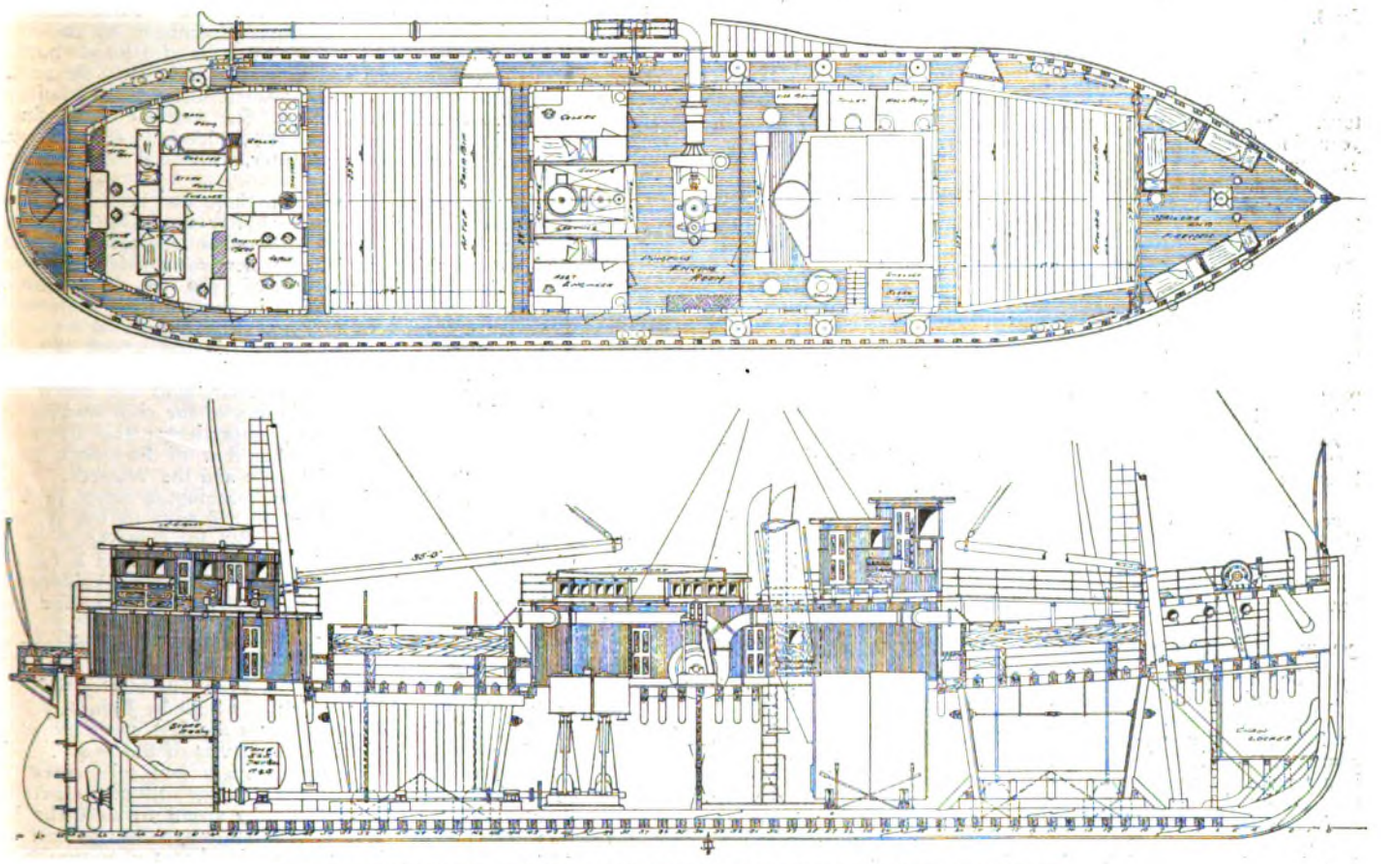
BIDS FOR WOODEN SUCTION DREDGE.

Bids will be opened by Capt. J. C. Sanford, government engineer at Philadelphia, on Sept. 21, for the construction of a wooden, single-screw suction dredge for Key West harbor. The dredge is to be 141 ft. over all, 130 ft. keel, 31 ft. beam, and 15 ft. deep. The keel is to be of oak, knees of hackmatack and deck beams and planking of Georgia pine. The hull is to be subdivided by three athwartship bulkheads. The forward bin is to extend from frame No. 10 to No. 20 and the after bin from frame No. 45 to 56. The dredge is to have two Oregon pine masts, 68 ft. long, and fitted with all necessary iron work and rig. The main house aft is to contain galley, mess room, store room, three sleeping rooms and a bath room. The pilot's house and captain's room is to be finished in oak, spruce and white pine.

The dredge will be propelled by a fore and aft vertical, inverted, compound condensing engine with cylinders 17 and 32 in. in diameter with stroke of 24 in., supplied with steam from one Scotch return tubular boiler 13 ft. 6 in. in diameter and 12 ft. long, fitted with three 39-in. corrugated furnaces. The dredging pumps are to be 15 in., of centrifugal type and extra heavy construction, especially adapted for dredging. The blades are to be covered with removable steel plates for their entire working surface. The depth of the blade is to be uniform and to pass in easy curve from suction inlet to the periphery. The number of revolutions of the disc of this pump is to be between 200 and 250 per minute; and the pump is to be capable of raising and discharging against a total head of 14 ft. 60 cu. yds. of water per minute. The pumping engine is to be of the vertical, inverted, compound condensing type with cylinders 12 and 22 in. in diameter by 14 in. stroke, and it is to be directly connected to the 15-in. sand pump. The dredge is to be equipped with a steam hoister of the Lidgerwood or Williamson make and is to be lighted throughout by electricity.



Longitudinal Section and Deck Plan of Wooden Suction Dredge for Key West Harbor.

MERCHANT SHIPPING OF UNITED KINGDOM.

A Blue Book just issued contains tables showing the progress of merchant shipping in the United Kingdom and the principal maritime countries. They have been compiled by the commercial, labor, and statistical department of the Board of Trade. In the table giving the tonnage of sailing and steam vessels of different nationalities, which entered and cleared in the foreign trade at ports in the United Kingdom in 1902, Britain stands first with the enormous total of 64,900,000 tons. Of foreign countries, Norway heads the list with 6,700,000, with Germany next, having 5,600,000, then Sweden with 3,600,000, followed by Denmark, Holland, and Spain in the order named. If steamships only are reckoned, England represents a tonnage of 63,000,000, and the positions of foreign countries are reversed to this extent, that Germany stands next with 5,100,000 tons, followed by Norway with 4,700,000, then Denmark, Holland, Sweden, and Spain in the order written. The tonnage entered and cleared at United Kingdom ports in the trade with the United States was:—British, 12,100,000; United States, 560,000; other countries, 1,100,000. The British figures represent a decrease of 500,000 tons on 1901, but an increase of the same amount on 1900. The tonnage entered and cleared in the trade with British possessions totalled:—British, 11,800,000; foreign, 1,300,000. The total merchant navy of the British empire in 1901 (the figures for last year are not given) was 35,353 vessels, with a net tonnage of 11,120,388. In 1896 (the previous period of comparison) the figures were:—Vessels, 37,735; net tonnage, 10,503,307. The United States comes next with 20,645 vessels and 4,854,310 gross tonnage in 1901, against 20,869 vessels and 4,233,468 tons in 1896. The proportion of foreigners to every 100 British persons employed (exclusive of lascars) in vessels belonging to the United Kingdom, Isle of Man, and Channel islands, which were returned as engaged in the home and foreign trades in 1902, was 22.82. The percentage in 1901 was 21.76, and in 1900 21.14.

SHIP BUILDING ON PACIFIC COAST.

San Francisco, Sept. 5.—Ship building on the Pacific coast is fairly active. At the yard of the Fulton Iron Works, San Francisco, a steamer is being built for the Watsonville Transportation Co. to be used in the fruit trade between Watsonville and San Francisco. The company is also to install the machinery and boilers on two steamers—Shasta and Elizabeth.

At Moran Bros. Co.'s works, Seattle, Wash., the passenger accommodation in the Boston Steamship Co.'s steamer Shawmut has been materially changed. The Shawmut will go to the Puget Sound navy yard for a general overhauling. Her place will be taken at Moran's by the Tremont of the same line. Each vessel is to have accommodations for 600 passengers, forty first cabin, sixty second cabin and 500 steerage.

John Lindstrom, Aberdeen, Wash., has begun work on two new steamers—one for Beadle Bros. to be 186 ft. in length, 36 ft. beam and 12 ft. 6 in. deep; and the other for Charles Higgins to be 169 ft. in length, 34 ft. beam and 11 ft. deep.

E. W. Heath, Puget Sound, will build a new steamer for the Alaska Steamship Co. She will be 250 ft. long, 38 ft. beam and will cost $215,000. She will be equipped with triple-expansion engines and Scotch marine boilers.

The Seattle Ship Yards Co., Seattle, Wash., has begun work upon a new marine railway to be 250 ft. long and capable of caring for vessels up to 2,000 tons.

Hall Bros., Winslow, Wash., are converting the ship Invincible into a five-masted schooner for the lumber trade.

The Russian authorities have taken recently two steps which cannot fail to increase the importance of the new port of Dalny. First, it has been decided that Dalny shall be the port connecting the Eastern China railway with the steamship service of the Pacific; great efforts are being made to provide the necessary accommodation for travelers passing through the port of Dalny; secondly, the mails will be conveyed by way of Dalny.

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PITTSBURG COAL CO.'S GREAT PURCHASE.

A deal of far-reaching significance was made during the past week when the Pittsburg Coal Co. secured a controlling interest in the Monongahela River Consolidated Coal & Coke Co. Henry W. Oliver represented the Pittsburg Coal Co. in the negotiations. It is announced that the minority interest has been given the privilege of disposing of their stock upon the same terms as the majority. The Monongahela River Consolidated Coal & Coke Co. is capitalized at $40,000,000 and its output last year approximated 8,000,000 tons of coal. The combination of interests will represent a total of $132,000,000 and the tonnage close to 25,000,000 tons. During the past two years more of the product of the mines of the Monongahela River Consolidated Coal & Coke Co. reached the lake than ever before. Two years ago one of the principal competitors of the Pittsburg Coal Co. in the lake trade secured the output of some Consolidated Co.'s mines and since that time the company has been a lake shipper. A very large part of the output of the company's mines has been sent south.

The Monongahela River Consolidated Coal & Coke Co. is capitalized at $40,000,000, divided into $20,000,000 common stock, $10,000,000 preferred stock and $10,000,000 bonds. The amount of the latter now outstanding is about $9,350,000, the reduction having been made by the retirement of bonds out of the sinking fund. Its total resources, according to the last annual report, slightly exceeded $45,000,000. The company ranks next in size to the Pittsburg Coal Co. in the production of coal in the Pittsburg district. The output of its mines last year approximated 8,000,000 tons, and for the current fiscal period will reach 9.000,000 tons. The company has been paying 7 per cent. dividends each year since its organization on its preferred stock, but none has ever been paid on the common.

The output of the Pittsburg Coal Co. last year approximated 15,000,000 tons, or 62 per cent. of the total coal mined in what is known as the Pittsburg district. This year the output will be increased. Taking the 9,000,000 tons produced by the Monongahela Coal Co., the combined tonnage will be very close to 25,000,000 tons. This is about one-fourth the total output of bituminous coal in Pennsylvania last year, and only 5,000,000 tons under the total production of Illinois in 1902, which state ranks next to Pennsylvania as a producer of soft coal.

The capitalization of the Pittsburg Coal Co. consists of $32,000,000 common stock, $32,000,000 preferred stock, and $6,000,000 debenture bonds. Its acreage, plant and equipment are valued at $77,000,000 and its total assets at $87,000,000. Adding the $45,000,000 assets of the Monongahela Coal Co., the combination of interests represents a total of $132,000,000.

Considerable space has also been given in the newspapers to a report that coincident with the absorption of the Monongahela Coal Co. by the Pittsburg Coal Co. that the Pennsylvania railroad is acquiring control of the Pittsburg Coal Co. with the intention of minimizing the effect of the Wabash's entry into Pittsburg—but no corroboration of this feature has been received.

CONSOLIDATED LAKE SUPERIOR REORGANIZATION.

The plan of reorganization of the Consolidated Lake Superior Co. at Sault. Ste. Marie, Ont., has been decided upon, but it is not issued to stockholders as yet. It is understood to be about as follows: For every share of old stock, both preferred and common, there is to be asked a payment of $8 new money. This is not an assessment, as the stock is non-assessable, but it is demanded by the reorganizers as preliminary to the participation in reorganization by old stock. Upon the payment of this money, or of that part called in cash, for every 100 shares of old preferred the holder shall be given forty shares of new common. As old preferred is now worth in the market about $6, this will make his new common stand, at present value, about $14. Every holder of 100 shares of old common is to have twenty shares of new common after paying his $8 per share, making his new common stand him, on present value, about $8.75. As there are about 1,000,000 shares of old stock, this will give $8,000,000, the money originally considered necessary for the completion of the company's enterprises. This will cut the capitalization to less than $40,000,000, nearly the exact sum put into the enterprises. It is understood that stockholders taking advantage of this offer shall have rights on the stock of any who may be delinquent therein, at the same terms, and it is also understood that the Speyer loan of $5,050,000 is to be taken up by the reorganization committee and foreclosed for the benefit of those who go into the reorganization plan. This will leave the property without bonded debt other than the bonds of two or three of the underlying companies, including the Michigan Lake Superior Power Co., the Tagona Light and Water Co. and the street railway and ferry line. Earnings for present months are said to be more than satisfactory.

CONGRESSMAN BURTON IN BERLIN.

Congressman Burton, chairman of the committee on rivers and harbors of the house of representatives, has reached Berlin in his European tour. He will visit the lower Elbe near Hamburg and the canals of northern France before returning home. Speaking of his investigations, which were begun early in June, he said in Berlin:

"We found illustrations throwing light upon almost every proposition in the river and harbor works of the United States. Everywhere in Europe there is a disposition to make increased use of the inland waterways, whether rivers or canals. The value of this means of transportation is coming to be realized more and more. In France and Germany and portions of Russia the quantity of freight carried by water is increasing more than carried by rail. There is a strong movement for the improvement of the inland waterways, and there is a growing opinion also, though not as potent or universal, in favor of tolls on the waterways which are improved. It would seem that Europe affords better opportunities than America to study the proper relation between railway and waterway transportation, because frequently a state which is improving its rivers and building canals also owns the railways. But, for various reasons, the field is not much better. In some countries the policies adopted towards the two methods of transportation are widely different. In others the railways and waterways are managed by different government departments, each trying to make a good showing, and the competition which arises is almost as keen as in the United States."

ARMORED CRUISER MARYLAND TO BE LAUNCHED.

At the yard of the Newport News Ship Building & Dry Dock Co., Newport News, Va., the armored cruiser Maryland will be launched on Saturday next. She is sister to the Pennsylvania recently launched at Cramps. What a difference there is between the Maryland and the Falkland, which was the first ship of battle line built in the United States. She was built in Portsmouth in 1690 and was presented to the English government by the colonists and added to the navy in 1695. She was of 637 tons burden and carried thirty-four guns and a crew of 226 men. After the Falkland, type considered, was the historic Constitution, built at Boston in 1797, and still in existence. She was one of the finest frigates afloat in her time and was 175 ft. long, 45 ft. wide, and when ready for sea drew 20 ft. of water, with 2,200 tons displacement.

From the day of the Constitution there was little change in the type of warships built in this country until the advent of steam, and the Powhatan and the Minnesota represent two types of the earlier steam frigates. The former was a side-wheel vessel built at Philadelphia in 1850, was of 3,980 tons displacement, carried seventeen guns and continued in service until 1887, when she was condemned and sold as junk. The Minnesota was of a class of six powerful auxiliary steam frigates, which were in their day probably the best war vessels in the world. To this class belonged the Roanoke and Merrimac, both cut down and converted into ironclads at the beginning of the civil war by the federal and confederate authorities, respectively; the Franklin, in which Admiral Farragut made his tour of European ports after the close of the war; the Colorado and the Wabash.

The Minnesota was built at the Washington navy yard in 1855 and is still afloat, having been turned over to the Massachusetts naval militia. She is 264 ft. 8½ in. long, 51 ft. 4 in. wide and displaces 4,700 tons. She originally carried a battery of forty-six guns. Her engines of 1,000 H. P. were considered as only auxiliary power, her sails being mostly relied upon for propulsion.

The most radical departure from precedent in the history of warship construction came while the Minnesota and her class were still new, and one of them, the Franklin, was unfinished. This was the original Monitor, which was built by John Ericsson in 1861, and though individually she was the first crude development of an idea she revolutionized the navies of the world. Her service showed naval architects that spars and sails must no longer be considered as a part of a war vessel's means of propulsion and that ships must be protected by armor to meet the improvements in ordnance. While the Monitor type has passed out of favor as a sea-fighter, there are certain phases of national defense in which some authorities consider it as the latest development, and the Arkansas, Florida and Wyoming as the best vessels of the type that have been devised, but it is hardly probable that the United States will construct any additional ships of this type.

Then came a period in the development of the United States navy, when what are now considered "freak" ships were built. The Katahdin is, in a sense, the outcome of the confederate ram Tennessee. Admiral Ammen, who participated in the fight between that vessel and the federal ships, always thereafter held a belief that the ram was the most formidable weapon of marine warfare, and finally persuaded congress to authorize the construction of a vessel after his designs, and the Katahdin was commenced at the Bath Iron Works in July, 1891. She was not completed until 1896. The Katahdin is 251 ft. long, 43 ft. 5 in. wide, 21 ft. deep and has a displacement of 2,155 tons. Her turtle-back deck rises only 6 ft. above the water and is armored all over with steel plates ranging in thickness from 6 to 2 in. Her armament comprises only four 6-pounder guns. The Katahdin had no opportunity to display her qualities during the Spanish war.

The chief characteristics of the Maryland are: Length, 502 ft.; extreme breadth, 69 ft. 6½ in.; displacement, 13,680 tons, and mean draught, 24 ft. 1 in. Her engines will be of 23,000 I. H. P. at 120 revolutions a minute, with a steam pressure of 250 lbs. to the square inch, giving an estimated speed of 22 knots an hour. The engines are of the four-cylinder, vertical, inverted direct-acting, triple expansion type.

Protection will be furnished by armor consisting of the water-line belt extending from the bow to the stern about 7 ft. 6 in. in width; abreast the machinery space and magazines this armor will be 6 in. in thickness at the top, tapering to 5 in. at the lower edge. Forward and abaft the armor will be reduced to a uniform thickness of 3½ in.

The armament of the Maryland will consist of four 8-in.

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guns mounted in pairs in two electrically controlled elliptical-balanced turrets, one forward and one aft, which have an arc of train of at least 270°. On the main deck at the corners of the superstructure there will be four 6-in. guns with an arc of train of at least 145°. On the gun deck the main broadside battery of ten 6-in. guns, five on each side, will be located, having not less than 110° arc of fire. On the main deck, fore and aft, and also within the superstructure, will be located the 3-in. guns of the secondary battery, eighteen in all. The secondary battery will also consist of twelve 3-pounders, eight 1-pounders, two 3-in. rapid-fire guns, two machine guns and six automatic guns of small caliber, mounted in commanding positions and on the military tops.

STEAMER FOR SOUTH AFRICAN TRADE.

Glasgow, Sept. 1.—A new intermediate steamer for the South African service of the Castle Line will interest Americans competing in this trade. The twin-screw steamer Cluny Castle has just been launched by Barclay, Curle & Co., Ltd. The new vessel is constructed of steel to Lloyd's highest class, and is rigged as a two-masted fore and aft schooner. She is 5,000 tons gross, with a carrying capacity of 10,000 tons, the general dimensions being as follows: Length, 432 ft.; breadth, 50 ft. 3 in., and depth, 31 ft. 1 in. The Cluny Castle marks a departure in steamship design, inasmuch as she is constructed to carry third-class and steerage passengers only. This makes the vessel a most desirable one from the third-class passenger's point of view, as he thus receives all the attention which in an ordinary steamer is divided in possibly unequal shares between himself and the first and second-class passengers.

The hatch to the main hold is sufficiently large to ship a Pullman car or a locomotive, while a derrick is fitted capable of lifting 20 tons. There are six other hatches of ample size, as well as ten derricks and ten powerful steam winches. With the object of making the best possible arrangement for stowing cargo the lower deck has been omitted, but specially strong and deep frames are fitted, thus leaving the lower holds entirely free for cargo without any sacrifice in strength. A long poop, bridge and forecastle are built upon the upper deck. The poop is partly covered by a boat deck forming a sheltered promenade for passengers, and above this are the wheel-house, chart-house, and navigating bridge. The decks throughout are of teak. The vessel is lighted throughout with electric light. Steam steering gear with liquid brakes is fitted in a steel house, aft on the poop and controlled from the navigating bridge amidships, and a powerful steam windlass and capstan are fitted on the forecastle head for working the heavy cables and stockless anchors with which the vessel is provided. Awnings are fitted fore and aft for the comfort of passengers, and twelve lifeboats are placed so as to be easily and rapidly put into the water. Water ballast is placed fore and aft in the cellular double bottom and in accordance with the modern practice of enabling a vessel to go to sea with safety with little or no cargo. In addition, a large deep-water ballast tank is erected forward of the engines and boilers, making a total water-ballast capacity of about 2,000 tons. The machinery consists of two sets triple-expansion engines constructed by the builders, and is capable of developing about 3,500 I. H. P. and is supplied with steam from four large single-ended boilers with natural draft. The twin-screws are of manganese bronze, and the shafts are of steel. The engine-room outfit of auxiliary machinery is unusually complete, and includes large evaporators, and filters for renewing the ample supply of fresh water which is carried in two large-compartments abaft the engine-room, as well as dynamos for generating the current for the electric light and refrigerating machinery for freezing, and thus keeping absolutely fresh the butcher meat, vegetables and other provisions carried in the cool chambers for the use of the passengers.

CHANGES IN THE BRITISH NAVY.

No one can remain for many days upon a British man-of-war without noticing the quiet revolution which is in progress. It is affecting almost all branches of the service. We have finally bid good-by to the old spacious days; steam and steel and mechanics have driven sails and wood and brute strength over a bourne from which they can never return. As lately as two years ago, when I last witnessed maneuvers at sea, authorities still held desperately to the last remnants of old times; still shut their eyes to the inevitability of the completion of the revolution which began under the Russian defences, when the iron floating batteries of Napoleon III., by their invulnerability to fire, convinced the world that the wooden ship had to go. Every movement which a few years ago was done by hand is now performed by machinery driven by steam, hydraulics or electricity. This ship has about eighty auxiliary engines. An ordinary seaman who can calculate, who knows the why and wherefore of the mechanical operations around him, is more to be desired by a modern captain than the seasoned bluejacket of the picturesque school, who was acquainted with all that was to be known of spars and sails. He was made what he was and kept in a state of efficiency by drilling on masts and yards, and now that they have disappeared finally, the problem has had to be faced—How are the bluejacket, the stoker and other ratings to be developed and kept physically fit? During the present cruise I have seen how important the gymnastic instructor is bound to become in the training ships in the ports, and also in the ships at sea. After some days at sea, with little or no active exercise, such as the masts and yards provided, men perforce became woolly-headed and dull. A day or two ago I witnessed the whole of the watches, under the orders of the commander, doubling round and round the ship to the strains of the band, here and there a jump being provided to break the monotony. Six times round the deck each body of men raced, and at the end many of the less fit were puffing and blowing like porpoises, a sure sign that the exercise was necessary. Bell bars, horizontal and parallel bars, and the boxing gloves have their parts in this effort to find substitutes for the masts and yards. One evening I came upon two men, of magnificent muscle, with gloves on, sparring "down below" with immense zest, and on Saturday afternoon, the day's work over, an animated scene occurred on the lower deck, when the band played dance music. Bluejackets chose partners, and round they whirled with an energy that would have caused consternation ashore. Of course they had on no boots. This is the rule. In the recreation room at Whale island, the great gunnery school, I remember seeing a large sign, "Dancers are requested to remove their boots." The warning is hardly necessary, and the bluejacket feels more himself when his feet are bare than when they are shod. This desire for physical exercise of as violent a type as possible affects all classes, and if it cannot be met, crooked temples, listlessness and a loss of *esprit de corps* result.

After quarters in the afternoon officers off duty will congregate on the quarterdeck in "sweaters," race round it their hardest, try their prowess with the gloves, the foils, bar-bells, or even the skipping rope. The last provides an excellent relaxation, as it brings so many muscles into play. This vessel is fortunate in having a captain—Capt. Charles E. Madden, M. V. O.—who leads in hours of leisure as he controls the whole crew during the period of duty, himself joining in these recreations; and a night or two since the admiral joined with the ship's officers in the lancers on the quarterdeck, when the band played after dinner. This way lies that spirit of willing service which oils the wheels of life on board a man-of-war, which keeps tempers sweet, and promotes the *esprit de corps* which spells efficiency. No one in civil life exercises the same authority throughout the twenty-four hours as a captain and his chief executive officer, the commander, of a large ship, and if that control can be exercised strictly and yet without chafing the spirits of those controlled the service is infinitely more efficient.

Another coming revolution affects the feeding of the men. On Oct. 1 the new scale of dietary will come into force in ships in all parts of the world. It should be known that the committee whose recommendations the admiralty are going to carry out was appointed and at work before the notorious "play acting" in the Mediterranean fleet took place, two guests on board a warship living on service rations. The action of the admiralty did not, as seems to be supposed, result from what has been styled an "exposure" of the methods of feeding the men of the lower deck. It was not a subject upon which it was possible to legislate in a hurry. Feeling that it was a matter for the most mature consideration, the authorities did not worry the committee, but allowed it to call evidence of officers, non-commissioned officers, and men serving in all quarters of the globe, as well as several doctors. Never did a service committee take greater pains to sift complaints and suggestions. As a result, we are on the eve of a complete revision of the conditions in which the bluejacket lives. In the past he has been given quantity and, as a rule, quality, but not variety, and in very boredom at the weary round of rations he has been in the habit of spending a considerable sum out of his own pocket on more or less necessary commodities. For these he has paid anything from 3d. to 9d. a day out of his pay, a large sum considering the amount of pay he receives. Now this order of things is to come to an end, and no longer will the fleet men have only three official meals a day—breakfast on turning out, dinner at noon, and supper—mark this—at a quarter-past four o'clock. The well-established custom of giving the men time to have a hasty breakfast at "stand-easy" about eight o'clock in the morning, and a real supper at night before turning in, will be recognized officially, and will not depend on the will of admiral or captain. In future they will have five duly recognized meals, occupying three hours and thirty-five minutes, instead of only two and a half hours, as now, and the dietary has been arranged with a view to providing a variety of food. They will receive more tea, sugar, preserved meat, raisins, and fresh vegetables when these can be obtained, and for the first time the official ration will include compressed vegetables, jam, condensed milk, and coffee; the bluejacket will still be without butter. As a set off, certain reductions in the quantity of other articles will be made, and Jack will have less salt tack. These reforms will cost over £100,000 annually.—London Telegraph.

Two new harbor type revenue cutters are at present doing duty in New York harbor. They are the Winnisimmet, built for service in Boston harbor, and the Mackinac, built for use at Sault Ste. Marie, Mich. The Spedden Ship Building Co. of Baltimore built both vessels. Each vessel is of steel, 96.5 ft. long, 20.5 ft. beam and 10.3 ft deep. There is one engine with cylinders 13, 21 and 32 in. in diameter by stroke of 24 in. Steam is supplied by Roberts water-tube boilers. The pilot house of the Mackinac is very roomy, its length allowing five windows to each side. It is fitted with speaking tubes connected with the several parts of the ship and a racket crank is employed in working the whistle. The room is trimmed in cherry and neatly upholstered in red plush.

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APPRECIATION OF ADMIRAL MELVILLE.

Probably no man more thoroughly understood and appreciated Rear Admiral Melville than Mr. Walter M. McFarland, who was for many years associated with Admiral Melville and was one of his most trusted lieutenants. Those who had the pleasure of knowing Mr. McFarland when he was a member of the bureau of steam engineering, know how thoroughly he worked in unison with his chief and how helpful one was to the other. It is therefore with genuine pleasure one reads the brief appreciation of Admiral Melville's services, which appears in the current issue of Cassier's Magazine and from which the following excerpts are taken. Mr. McFarland says:

"The officers who have filled the position of engineer-in-chief of the United States navy have maintained a high average of ability, but among them three names stand out pre-eminently,—Charles H. Haswell, the first engineer-in-chief, as well as the first engineer of the navy; Benjamin Franklin Isherwood, engineer-in-chief during the civil war; and George Wallace Melville, who, on Aug. 8 of this year, completed a term of exactly sixteen years, during which period the new navy of the United States came into being. His term of office, if not the longest of any bureau chief in the history of the navy department, is certainly the longest for many years.

"Admiral Melville's work has been so important and so constantly before the public, which in late years has taken an intense interest in the navy, that most engineers are familiar with the details of his more recent career. This magazine a few years ago published a careful and sympathetic biography of him, brought down to the date of publication, and it is not intended at this time to repeat these details of his earlier career, but to give a brief account of the more important events which give special significance to his term of office as engineer-in-chief of the navy. It is especially fitting that such a notice should appear just at this time, when he has laid down the office which he has filled with the greatest credit to himself and to the engineering profession, as well as with great benefit to the government.

"It was not necessary, when Melville was appointed engineer-in-chief, for the layman even to ask 'Who is this man?' His record as an arctic hero had made his name known throughout the civilized world, and the story of the Jeanette showed him to be possessed of those qualities which have contributed to make the administration of his high office so successful. To engineers, it was well known that, besides his arctic record, Melville was one of the foremost engineers in the navy, a man ready for any duty to which he was assigned, and one who was always picked out for any work of a peculiarly difficult or trying nature. He had been assigned to the Atlanta, one of the early ships of the new navy, to get her into good shape, and, after completing that work, was the engineer inspector at Cramp's.

"About this time the attention of Secretary Whitney was called to him as a man likely to carry out efficiently Mr. Whitney's ideas for the building of the new navy and giving these new ships the latest and best machinery. Accordingly on Aug. 8, 1887, Admiral Melville was appointed engineer-in-chief, and in January of the next year, when congress was in session, this recess appointment was confirmed. His appointment was distinctly based on merit, and this proved the more conclusively from the fact that for sixteen years, notwithstanding the change of political parties, he was regularly reappointed, until by reason of age and statute law he has been compelled to lay down the cares of his office.

"Prior to his taking office, the four Roach cruisers had been built and a few of the vessels which immediately succeeded them were in process of construction; but except for these, all of the machinery of our new navy as it exists today was designed and built under his supervision and responsibility, the total horse power of the main engines amounting to about a million. This is a good place to emphasize the fact that just before Melville took office there had been a movement on foot to depend for plans on foreign designers. Indeed, as is well known, the plans for the Texas, the Baltimore, and the Charleston were purchased abroad. The writer will not go into details about the troubles which resulted from this policy, although they were very great. At all events, with Melville's appointment this policy was definitely abandoned, and he was expected to get out designs for machinery which would be equal if not superior to the best that could be obtained abroad. The writer does not believe that he will be accused either of undue personal regard or blind patriotism when he affirms that the result has proven all that, and more than, could be expected.

"Before he took office, Melville was noted for his marked frankness and sincerity in expressing himself and his absolute fearlessness in the performance of duty, so that when he believed it right to express himself openly he never considered what the consequences might be to him personally. It is related that when his first annual report as chief of the bureau of steam engineering appeared in the fall of 1887, his extreme directness in calling attention to the needs of the engineer corps and what should be done to increase efficiency, aroused intense opposition on the part of certain naval officers who went so far as to protest about it to the secretary and urge that Melville's appointment, which as yet was only ad interim, should not be confirmed.

"The report was brought to the attention of President Cleveland, but so far from this frank speech having the effect on him which the complainants had hoped, he found that Melville's sturdy honesty was of a piece with his own, and he is reported to have said, 'This is just the kind of a man we want. I only wish we had more like him.'

"This frankness of comment has distinguished Admiral Melville throughout his whole career and has been one of the sources of his great strength, especially with congressional committees, who soon came to know that he said exactly what he meant, and there was no difficulty in understanding him.

"One of the first important things which the admiral did after taking office was to institute a competitive test of water-tube boilers, for the purpose of installing them on one of our naval vessels and giving them a practical working test. As a result of this, Ward boilers of about 5,000 H. P. were fitted to the coast defense vessel Monterey, which was thus the first war vessel larger than a torpedo boat to have such an installation. At the same time water-tube boilers were definitely adopted for all steam launches. They were, of course, a necessity in torpedo boats and similar craft.

"Although Melville was the first engineer-in-chief of any navy to install water-tube boilers, he did not allow himself to be carried away with a desire to make a great record for progress by adopting them at once for all vessels, but decided to wait until they had been tested thoroughly. The wisdom of this course has been shown by the unfortunate results which have come in some other navies, which, adopting water-tube boilers at a later date, went into the matter immediately on a very large scale. Indeed, this conservatism, combined with a most progressive spirit, has been a marked characteristic of the admiral at all times. Just before he took office, forced draft was adopted for naval vessels, and one chief of a foreign navy, who was not so conservative, wrecked his reputation by building his cylindrical boilers too small to stand up under the stress. It has been a favorite remark of Melville that he never sent a boy to do a man's work, and following this plan with cylindrical boilers, our navy never had any serious trouble.

"One of the greatest exploits was the building of the two cruisers Columbia and Minneapolis. These were the first very large vessels to use triple screws, each ship developing about 20,000 H. P. on trial and breaking the speed record for naval vessels larger than torpedo boats. The writer was an assistant of Admiral Melville at the time of this design, and he desires here to place on record that all the credit of the success of this type of machinery is due absolutely and entirely to the admiral himself. He was advised not to use this system by many of his friends of great experience and ability, as well as by some of his older assistants, for whose opinion he had great respect. He felt, however, that the smaller vessels of this system which had been tried, showed that it would succeed, and the circumstances of the case made it the best design.

"The results astonished even him in respect to the economy of propulsion, because the vessels made about a knot more speed than either he or anybody else had anticipated. It has been a source of great surprise that triple screws have not been used on other of the large vessels, as it is well known that the admiral is a sincere believer in the efficiency of the system and has been a constant advocate of it. It is perhaps not desirable at this time to give what the writer believes to be the reason for the opposition to this system, but it is well to note that it has been very largely used in all foreign navies, except that of Great Britain.

"It cannot be attempted in a hasty sketch like this to go into all the details of the efforts made by the admiral for engineering progress in the way of improved materials, increased steam pressures, higher engine speeds, etc. Reference may be made, however, to the numerous experiments carried out with a view to determining the adaptability of oil fuel to the uses of war vessels. Accounts of these have been published and have given a great deal of valuable information, both as to the economic and potential results, and details of apparatus necessary. The latest of these tests have just been published. Mention may be made also of the admiral's policy of publishing in his annual report each year the designs prepared by the bureau of steam engineering for the machinery of the new vessels authorized by congress. These illustrated reports have been extremely popular throughout the country and of very great benefit to the engineering profession. A mistaken and cheese-paring economy led to their suppression for a number of years, but in later reports they appeared again.

"While realizing as thoroughly as any other naval officer that a war vessel is very largely a gun platform and that offensive power is to be given the greatest consideration, the admiral has been a consistent advocate of the highest practicable speeds for vessels of all types. A case which is at the present moment unsettled, shows that he has not always had the co-operation of all his colleagues in this respect. The most marked case, however, was in 1898, when it was seriously proposed, in asking for bids for three new battleships, to simply repeat the designs of an earlier time, calling for vessels of 16 knots when all other navies were building vessels of 18 knots or higher.

"At that time Melville was absolutely alone in his fight for the 18-knot ships. It is probable that some of his colleagues would have liked to get them, but they were persuaded that delay would result in getting out plans if the attempt was made to get higher speeds. Fortunately for the country, Melville's efforts were seconded most strongly by the general and technical press with the result that while the department's own proposition was for the slow ships, the contractors were given the opportunity to submit proposals for 18-knot vessels also. To their great credit, be it said, all of them did submit such proposals, and as a consequence the contracts were made for vessels of higher speed.

"We may mention, in passing, the two novelties in an engineering way introduced by Admiral Melville at the time of the war

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with Spain, namely, the repair ship Vulcan and the distilling ship Iris. The repair ship was not a novelty in conception, for plans had been prepared for one some years before when there was a possibility of war with Chili on account of the Itata case, but the Vulcan was the first repair ship to be used in warfare, and actually accompanied the fleet. The pages of this and other technical magazines have had detailed descriptions of the Vulcan, and nothing further need be said here than that she proved a tremendous success in every way. The distilling ship was not completed until just about the close of the war, so that there was no opportunity to get the benefit of her services; but the precedent has been established, and there is little doubt that in the future distilling ships will be a feature of the auxiliaries to our battle fleets.

"Mention ought also to be made of the fact that the usefulness of Key West as a naval base during the war with Spain was due almost entirely to Admiral Melville's foresight and determination. We had a little machine shop there for years, but it was run down and almost worthless. He had recommended again and again that this be put in a state of efficiency, but was never able to get an appropriation from congress for that purpose. When it became reasonably certain that there would be war with Spain, congress gave the president $50,000,000 to prepare for it. Melville at once took prompt steps to fit out the Key West shops, and was fortunately able to get enough machinery there before the movement of troops began. Although the shops were small and of limited capacity, they rendered a very real service in maintaining the integrity of our blockading fleet."

Mr. McFarland then refers to Admiral Melville's efforts on behalf of the education of young engineers at the naval academy. Continuing, he says:

"The writer desires to take this opportunity to place on record a statement which he believes is due to the magnificent man whom he is proud to have served as an assistant for many years, and whose friendship he prizes most highly, with respect to his attitude towards the personnel question and its effect upon him personally. During the sessions of the personnel board (of which Admiral Melville and the writer were both members) it was decided to recommend the abolition of the grade of commodore, and it looked as if this would reduce the rank of the chiefs of bureau from commodore to captain, because it was not believed at that time that congress would be willing to give them the grade of rear admiral. Notwithstanding this, Admiral Melville expressed himself as perfectly willing to be thus a loser for the sake of the general good which would result from the adoption of the personnel scheme.

"It has been alleged by some that the admiral, captivated by the idea of securing a military title, permitted the engineer corps of the navy to disappear as a separate organization solely that he might be personally benefited. The fact is that the admiral, like the writer and the great majority of naval officers, believed that the scheme of the personnel bill was the best one for the navy as a whole, and for the engineer corps as a part; but while some officers might have expected to be personally benefited by this, there was every reason to believe that Melville himself would actually suffer a distinct loss both in rank and in pay. That the rank of bureau chiefs was made rear admiral when the bill came to be considered by the naval committee of congress, is something with which Admiral Melville had absolutely nothing to do, although it is very probable that the loss of rank to him, if chiefs of bureaus had been made captains, had great weight with the congressional committees.

"Another point, also showing the benefit to the service as a whole which his splendid personality has been, is in the provision of the personnel law that officers who had served during the civil war with a creditable record should, when finally retired, have the rank of the next higher grade. It is probable that relatively few except the members of the personnel board know just how this came about.

"At one of the meetings, toward the end of the deliberations, Admiral Evans pleasantly referred to the probability that Melville would shortly be a rear admiral. The writer called his attention to the fact that from the position on the amalgamated list of captains which would be taken by Melville, it was almost certain that he could never reach the grade of rear admiral by lineal promotion. Admiral Evans then said:—

"'Mr. Secretary, I feel this is a great misfortune, and we certainly ought to do something to show our appreciation of Melville and his work. I suggest that if he cannot become an admiral by lineal promotion, we at least arrange that he shall have the rank of admiral when he retires.'

"This met with unanimous approval, and it was at first intended that this provision should apply only to officers of the old engineer corps. Melville, however, called attention to the fact that some line officers, notably Admiral O'Neil, chief of the bureau of ordnance, who had entered during the civil war, would also fail to reach the grade of admiral by lineal promotion, and it was then decided to have it apply to all officers of the new line. When the bill came into congress, the congressional committees arranged the provision to apply to all officers who had served during the civil war. It is thus very evident that had it not been for the great esteem in which Melville was held by his colleagues, this great benefit to civil war veterans would not now exist.

"It is not out of place to remark here that the recent reorganization of the personnel of the British navy is along lines almost identical with those which had previously taken place in our own, and there can be little doubt that this was due very largely to our taking the first step. As already stated, the result in our own navy very probably came about mainly through Melville's own tremendous personality and magnificent work, so that we can feel that he has been a main factor in this great change in two of the greatest navies of the world.

"It remains to say a few words about the man as a man, apart from his work as an engineer and as an administrator. It has been said by many who have met him that he is one of the old Vikings who has reappeared a millenium after the others had gone. One has only to see him to realize the frankness and sincerity of the man, and one can be associated with him for only a short time to find that he is one of the most lovable, kind-hearted and considerate men whom one could ask to have as a chief.

"The writer well remembers the enthusiasm which he inspired in the young men who were his assistants when the writer first went on duty with him shortly after he came into office. There was absolutely nothing that we would not have done for him, and we counted it a pleasure to work over-time if he deemed it necessary. This ability to inspire loyal affection and devotion is one of the most remarkable characteristics of this man who is remarkable in so many ways. His heroism and undaunted courage under the most trying circumstances are known to all the world, but the lovable side of his character can naturally be known only to those who have the privilege of intimate friendship.

"He is a keen judge of character and ability, and has made very few mistakes in selecting his assistants. Having selected and proved a man, he then gave him his complete confidence and left him very largely to do his work, with gentle oversight and suggestion when necessary or when asked for. Further than this, there have been few cases of the chief of a great office who was so ready to give credit, not only in conversation but in print, to the work done by his assistants. Being a big, broad-gauge man himself, he has no small vanity which demands that all the credit for the work of his office shall come to him personally; but he has always been glad to see his assistants get all the credit they deserve.

"Admiral Melville's case is one of the few exceptions which emphasize the wisdom of the rule of retiring officers from active duty when they reach the age of sixty-two. He is today as hale and hearty and as vigorous mentally and physically as he was at fifty, and it is a distinct misfortune to the government that the operation of age limit retires him from further active service in the position which he has filled so splendidly. However, it has become government custom in recent years to call on retired officers of great ability for occasional special service, and undoubtedly the navy department will frequently avail itself of the admiral's talents.

"In thus placing on record a brief and very incomplete sketch of the official career of this great man in his high office, the writer knows that he is voicing the sentiments of all the men who have had the privilege of serving as assistants to Admiral Melville, and also of the large body of engineers who have been brought in contact with him. He believes also that engineers generally feel that his magnificent record as engineer and administrator is a just source of pride to the engineering profession as a body. Time was when engineers were content to do their work without much thought of receiving special credit for it, but 'times change and we change with them,' and this has become the age of the engineer. We feel, therefore, that as engineers we all have a right to take personal pride in the splendid personality, the great success, and the monumental work of Admiral George Wallace Melville, the engineer."

SHIP BUILDING DURING AUGUST.

The bureau of navigation reports 106 vessels of 26,984 gross tons were built in the United States and officially numbered during August as follows:

	WOOD.				STEEL.				TOTAL.	
	SAIL		STEAM.		SAIL.		STEAM.			
	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.
Atlantic and gulf.	29	4,884	28	1,206	1	3,248	4	1,200	62	10,538
Porto Rico	1	7	...	.....	...	.....	...	.....	1	7
Pacific	3	355	14	2,559	...	.....	1	484	18	3,398
Hawaii.....	...	.....	...	.....	...	.....	...	.....	...	.....
Great Lakes.....	1	16	7	176	...	.....	4	11,353	12	11,545
Western rivers...	....	.....	3	1,496	..	.....	...	.....	13	01,496
Total..	34	5,262	62	5,437	1	3,248	9	13,037	106	26,984

The hydraulic dredge Benyuard was launched last week at the yard of the William R. Trigg Co., Richmond, Va. The Benyuard was being built for the engineer department of the army by the Trigg company at the time of the failure of that company several months ago. The cruiser Galveston was also left in an unfinished condition by the enforced suspension of work at that ship yard and the government took possession of that vessel and removed it to Norfolk for completion. An arrangement was made at the time between the war and navy departments by which it was provided that the additional work required on the army dredge should be performed at the Norfolk navy yard. The new dredge is intended for work in the harbor of New York city.

The Risdon Iron Works, San Francisco, has received an order from J. H. Leggett of Oroville, Cal., recently for a large gold dredger costing $80,000.

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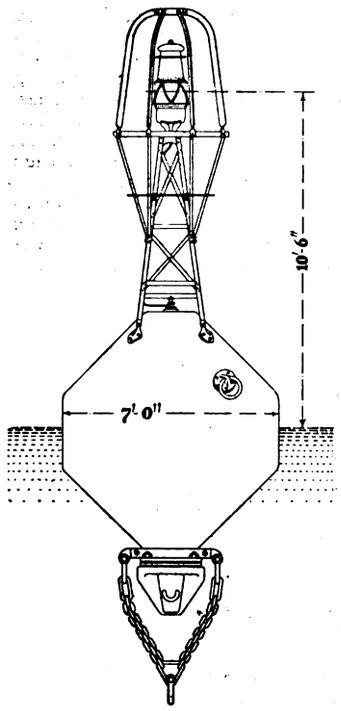
THE GAS BUOY.

The gas buoy is now so well known as an aid to navigation that improvements, which are constantly being made in it, are of interest to all vessel men. The Safety Car Heating & Lighting Co. of New York, which is in control of the Pintsch patents in the United States, Canada and Mexico, and therefore furnishes all the buoys used by these governments, recently published a table giving the daily consumption and cost of gas and days of service of the usual sizes of buoys fitted with various burners. In this table it is shown that at 12 atmospheres the type B111 buoy, illustrated herewith, and which is the kind generally used on the great lakes, will with a single burner of the flash kind burn for 528 days. With the single-burner, flash service, this buoy would burn only 4 cu. ft. of gas per twenty-four hours at a cost of only 2 cents per twenty-four hours for the gas. Of course there are cluster buoys that burn quite a large amount of gas, but the consumption of a single flame of 1⅛ in., with pilot jet of ⅞ in., is five-sixteenths of a cubic foot per hour burning continuously, while with the flash (equal intervals of light and darkness) the consumption is only three-sixteenths of a cubic foot per hour; and so the buoys, according to size and the service required, may be made to burn continuously day and night without attention for from eighty-five days to more than a year.



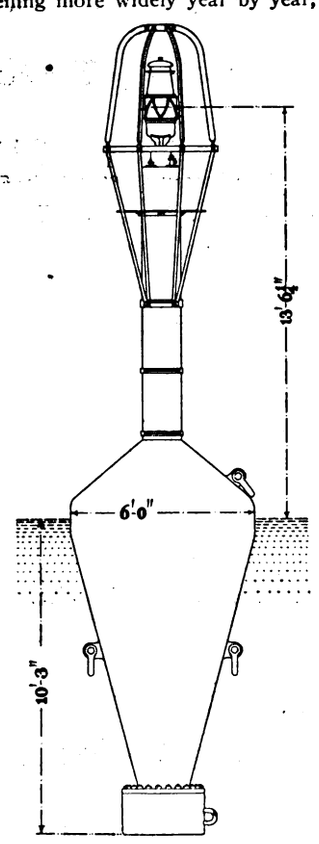
Type B111 Buoy.

There are now over 1,200 gas buoys in service, used principally by the governments of the United States, Great Britain, Germany, France, Russia and Egypt. The Suez canal is lighted at its entrance and throughout its length by these buoys, New York harbor has many of them and they are to be found in the rivers and straits connecting the great lakes.

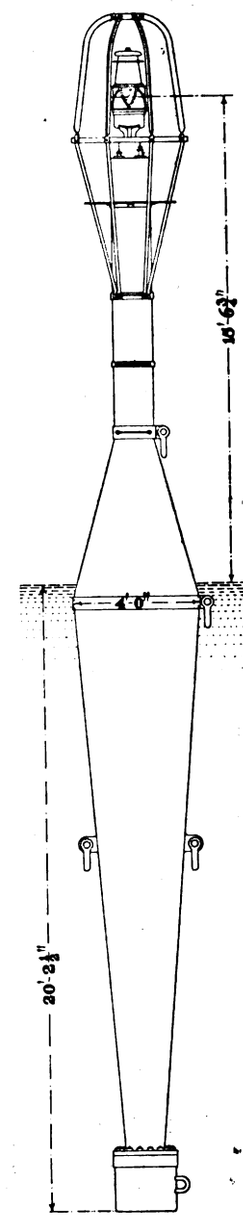
Type C buoy and type D buoy are new. They are in use in New York harbor and are giving great satisfaction.

PORTS THROUGH WHICH EXPORTS FLOW.

The doors through which the exports of the United States flow to the outside world are opening more widely year by year, and this seems to be especially true of the ports located on the Gulf of Mexico, the northern lake border, and the Pacific coast. Formerly the Atlantic coast ports held a very large proportion of the export as well as import trade, but in recent years the export trade is being distributed to the ports at the north and the south, as well as the west, though in importations the Atlantic ports still retain about 80 per cent. of the total import trade. The figures of the fiscal year just ended, compared with those of the fiscal year 1901, presented by the department of commerce and labor, through its bureau of statistics, show a reduction for Boston of $55,000,000 in exports; New York a reduction of $24,000,000; Philadelphia a reduction of $6,000,000; Baltimore a reduction of $25,000,000; Newport News a reduction of $7,000,000, and Norfolk a reduction of nearly $2,000,000. Moving down the coast toward the south, however, and still comparing the figures of 1903 with those of 1901, Savannah shows an increase in exportations of about $8,000,000; Wilmington, N. C., over $2,000,000; Galveston an increase of $3,000,000; Mobile an increase of $1,000,000, and New Orleans a decrease of $3,000,000.



Type C Buoy.



Type D Buoy.

Combining all of the Atlantic ports, the total exports of 1903, compared with those of 1901, show a falling off of $98,000,000; the Gulf ports show practically the same figure in 1903 as in 1901; Mexican border ports show an increase of nearly $5,000,000; Pacific ports an increase of $10,000,000, and northern border and lake ports an increase of $18,000,000 in the exports of 1903 compared with those of 1901. Thus the Atlantic ports are the only group showing a reduction in 1903 compared with 1901.

In imports, however, the Atlantic ports still hold their commanding position. The total imports of 1903 amounted to $1,025,000,000, and of this $821,000,000, or 80 per cent., came in through the Atlantic ports. In 1893 the total importations were $866,000,000; of this, $717,000,000, or 82 per cent., came in through Atlantic ports. Comparing the imports of 1903 with those of 1901, the Atlantic ports show an increase of $151,000,000; the Gulf ports, $12,000,000; Mexican border ports, $3,000,000; Pacific ports, $8,000,000, and northern border and lake ports, $25,000,000.

Comparing conditions at the principal ports in 1903 with those of 1893, it may be said that Baltimore shows an increase in exports from $71,000,000 in 1893 to $81,000,000 in 1903, and an increase in imports from $16,000,000 in 1893 to $27,000,000 in 1903. Boston shows in 1893 exports of $85,000,000, and in 1903, $88,000,000, an increase of $3,000,000; in imports Boston shows in 1893, $79,000,000, and in 1903, $86,000,000, a gain of $7,000,000. New York shows in 1893 exports of $347,000,000, and in 1903, $505,000,000, an increase of $158,000,000; and imports in 1893 of $548,000,000 and in 1903 of $618,000,000, an increase of $70,000,000. Philadelphia shows in 1893 an exportation of $49,000,000, and in 1903, $73,000,000, an increase of $24,000,000; and imports in 1893 of $66,000,000, and in 1903 of $60,000,000, a reduction of $6,000,000. Savannah shows in 1893 exportations of a little less than $20,000,000, and in 1903 over $54,000,000, an increase of $34,000,000. Galveston shows in 1893 an exportation of $37,000,000, and in 1903, $104,000,000, an increase of $67,000,000. New Orleans shows in 1893 an exportation of $77,000,000, and in 1903, $149,000,000, an increase of $72,000,000.

The following table shows the imports and exports of the Atlantic, Gulf, Mexican border, Pacific, and northern border and interior ports, respectively, in 1893 and 1903:

IMPORTS.

Ports.	1893.	1903.
Atlantic ports	$717,360,074	$821,283,328
Gulf ports	24,682,332	38,378,060
Mexican border ports	*13,825,550	13,377,190
Pacific ports	48,315,035	56,474,603
Northern border and lake ports	52,923,430	82,053,268
Interior ports	9,294,501	14,185,089
Total	$866,400,922	$1,025,751,538

*Includes $10,898 363 gold a d silver in ore; not included in figures of 1903.

EXPORTS.

Ports.	1893.	1903.
Atlantic ports	$624,278,456	$ 904,168,130
Gulf ports	125,591,932	285,021,144
Mexican border ports	12,151,900	25,935,871
Pacific ports	42,229,504	79,253,519
Northern border and lake ports	43,413,402	125,758,847
Interior ports		603
Total	$847,665,194	$1,420,138,114

The second annual convention of the Master Steam Boiler Makers' Association will be held at the Palmer House, Chicago, Oct. 7 to 10. It is expected that there will be a general attendance of superintendents, foremen, assistants and layer-outs of boiler shops.

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ITEMS OF GENERAL INTEREST.

The Kelley-Spear Co., Bath, Me., launched this week the three-masted schooner Frank Huckins for Charles S. Hirsch & Son of New York.

Five-masted schooner Elizabeth Palmer was launched recently from the yard of Percy & Small, Bath, Me. The Palmer is 300 ft. over all, 48 ft. beam and 28 ft. deep.

The half-yearly balance of the North German Lloyd shows, when compared with the first six months of 1902, an increase in the profits of nearly 4,000,000 marks. The surpluses of the months of July and August combined are estimated at about 1,000,000 marks.

The United States revenue cutter Hudson is being equipped with a 1,000-H. P. Roberts safety water-tube boiler at the James Reilly Repair & Supply Co.'s shops in Jersey City. This is only one of the many revenue cutters in which the Roberts company has installed its boilers.

Another large boat has been added to the fleet of the Nippon Yusen Kaisha. She was built at the Mitsu Bishi yard, near Nagasaki, and is a twin-screw steel boat of 6,444 tons gross and 3,995 tons net; speed 15 1-3 knots. She has just entered on her first voyage to Seattle. Her name is the Aki Maru.

Attention is called to the change of the firm of Lewis & Crane of Seattle, Wash., to Lewis & Hughes, who will continue this well-known lumber business. On hand now at their yard are ship timbers, deck spars and railroad material in large quantities. Orders can be promptly filled in any part of the United States.

The coal handling machinery installed by the C. W. Hunt Co., West New Brighton, N. Y., at the Lincoln wharf power station of the Boston Elevated Railroad Co., recently lowered the world's record for rapid unloading. The coal was raised 90 ft. above tide water and delivered to the storage pockets at the rate of 320 tons per hour. The installation follows in general design the standard Hunt steeple tower rig, the moving gear and coal cracker being electrically driven, and the hoisting engine directly connected. The overhang of the folding boom is 40 ft., and the capacity of the shovel 2 tons.

Electric launches, large electric barges, Venetian gondolas and a large number of other small craft will carry visitors over the two miles of waterway during the world's fair at St. Louis. The electric launches and barges will ply along a regular course, carrying passengers between stations the same as the intramural railroad. Boat landings will be supplied in various parts of the grounds. A feature of the water craft will be a fleet of boats of all nations, including the houseboat of China, the Balso of India, the out-riggers of the South Sea islanders, the surf boats of Hawaii, the canoes and dug-outs of the American Indian and the catamaran of Australia.

John F. Allen, 370-372 Gerard avenue, New York city, reports the following shipments of Allen portable pneumatic riveters for the month of August. This list comprises complete machines only: Oregonia Bridge Co., Oregonia, O.; New Jersey Bridge Co., Manasquan, N. J.; Manning, Maxwell & Moore, New York; Meehan Boiler & Con. Co., Lowellville, O.; Steel & Wike, Philadelphia, Pa.; Canton Bridge Co., Canton, O.; American Car & Foundry Co., Berwick, Pa.; Builders' Iron Foundry, Providence, R. I.; Worden-Allen Co., Milwaukee, Wis.; Chas. Churchill & Co., London, England; Carolina Steel Bridge & Construction Co., Burlington, N. C.; F. B. Tait Mfg. Co., Decatur, Ill.; Locomotive & Machine Co., Montreal, Can.; East Chicago Bridge & Iron Co., East Chicago, Ind.; Levering & Garrigues Co., New Market. "Our output," says Mr. Allen, "is up to our regular standard, taxing us to our utmost capacity. Orders are on hand sufficient to keep us going for the next three months at the same pace. At the same time collections are found to be exceedingly good."

In the Matter of the Assignment of the Columbia Iron Works.

Notice is hereby given, pursuant to an order made by the Circuit Court for the County of St. Clair, in Chancery, in the above matter, on the 5th day of September, 1903, the undersigned will sell at public auction to the highest bidder at the plant, the entire plant and property of the Columbia Iron Works, consisting of land, buildings, machinery, tools, materials, etc., constituting the steel shipbuilding plant located in the Township of East China, adjoining the City of St. Clair. The sale will be made September 18th, 1903, at ten o'clock A. M. Terms cash.

RUSS S. JENKS, Assignee.

Dated September 5th, 1903.

Full particulars of property can be had by addressing the assignee at St. Clair, Mich. Sept. 10

Steam Yacht Wanted.

Wanted—A steam yacht about 75 ft. long, 18 ft. beam, drawing not over 8 ft. when loaded; steel hull preferred. To be of a height to pass under bridges with 17 ft. head room. Speed to be not less than twelve miles an hour. To have a carrying capacity of seventy-five (75) persons without crowding. To have good kitchen accommodations. The entire mechanical equipment and all of the appointments of the boat to be first class. Send description of boat and machinery, photographs and terms to Thomas J. Webb, 117-121 W. Randolph street, Chicago. Sept. 10

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On Board Sea-going Vessels, NOT INCLUDING New Installations Building or Erecting.

French Navy	276,460 H. P.
English Royal Navy	849,300 "
Russian Imperial Navy	193,900 "
Japanese Imperial Navy	122,700 "
Austrian Imperial Navy	32,900 "
Italian Royal Navy	13,500 "
Chilian Navy	26,500 "
Argentine Navy	13,000 "
The "Messageries Maritimes" Company	87,600 "
Chemins de fer de l'Ouest: (The French Western Railway Co.) Steamships plying between Dieppe and Newhaven	18,500 "
Total Horse Power of Boilers in Use	1,634,360

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"WE MUST HAVE SHIPS."

Editor Marine Review:—Almost the last words William McKinley said to us at Buffalo, were "We must have ships." Without sufficient American built, American owned, and American manned ocean-going ships we cannot materially increase our export trade. This fact is painfully evident as we study foreign trade conditions.

In 1902 the port of Hamburg, Germany, received 8,689,000 tons of the registered tonnage of the ships of all nations. Our share of this was only a paltry 2,147 tons. One vessel flying the United States flag was seen in the port in the entire year.

Freight vessels carried $1,174,000,000 worth of our 1903, fiscal year, exports. Only $88,000,000, or 6 1-3 per cent. was carried in American vessels. In our imports we did a trifle better, the proportions being $836,000,000 in foreign vessels, against $123,000,000 in American vessels. Combining our vessel carried exports and imports we have: $2,010,000,000 in foreign vessels; $211,000,000 in American vessels. In other words, for every dollar of freight charges on American goods, kept in American pockets, we put nearly ten dollars in foreign pockets.

In his financial speech of a few days ago Secretary Shaw pointed out that our ocean-going marine is as much entitled to aid as are the water courses, lakes and harbors of our inland commerce, upon which congress yearly authorizes the expenditure of millions. In 1902 only one vessel arrived from the United States direct to Finland. Only one ship carrying the stars and stripes has ever visited a Finnish port. We sell Finland cotton, machine oil, flour, tobacco, resin and turpentine, hides, machines, implements, shoes, etc., with flour leading. These goods go by way of Copenhagen, Bremen, Antwerp, Hamburg and Hull—chiefly the two latter. Figures of our Finnish trade cannot be given, as they are treated at destination as exports from the ports named. This is all dead wrong.

Consul Joseph Bowron of Carthagena, Spain, says that with direct communication and a treaty of commerce we could win and hold the large Spanish trade for American flour. As long ago as May 15, 1848, the great economist, David Ricardo, said in the house of commons: "It was a singular circumstance that although the American vessels were the dearest built and dearest manned ships in the world, they had two-thirds of the whole trade between this country and the United States; while the Russians with the cheapest ships in the world were obliged to give us up the whole trade between their country and ours." This was said when the mutual repeal of the restrictive clauses of the navigation acts of this country and England was under discussion; a time when even ministers and literary persons were proud of our merchant marine.

At that time we did two-thirds of the trade between this country and Great Britain because, as explained by Ricardo, while one American vessel could load in all British ports with any cargo offering, British vessels in all ports were confined to a cargo of British products. No satisfactory estimate can be made of the increased cost of over-sea freights consequent on our withdrawal from active participation in ocean freightage which followed the consummation of that bargain.

What we need are American-built, American-owned and American-manned ships; American-born and American-trained salesmen; American ability and energy applied as vigorously to the capturing of the world's markets as now applied to the preservation and increase of our gigantic home markets, the largest market in the world (under protection); more American diplomacy of the successful kind which Secretary of State Hay is using in China and elsewhere; more of that dauntless Americanism which inspired Commodore Perry's "We have met the enemy and they are ours," the spirit of which message, though used in a different sense, will, if applied to our efforts for foreign trade, place and keep the United States in the van of the nations of the world.

WALTER J. BALLARD.

Schenectady, N. Y., Sept. 10.

The first vessel of a new steamship line between Tacoma and Australia and New Zealand, in connection with the operation of the New American-Australian Woolen Co., will arrive in Tacoma in October, and there will be sailings every four weeks thereafter. The new line includes four large steamships and is to be known as the Australian, Canadian & Puget Sound Line. Tacoma will be the home port for the liners on this side, and R. A. Alley & Co. will be the general agents, with offices in Tacoma. The company has made arrangements with the Northern Pacific railway operating in connection with it on the same manner as do the Oriental liners; the railway company soliciting and booking business for it all over the country, and acting as carrier for the eastbound freight brought in. Freight for the new line is already being booked by the agents at Tacoma.

U. S. Engineer Office, Jones Bldg., Detroit, Mich., Sept. 9, 1903. Sealed proposals for repairs to east dike, St. Clair Flats Canal, Mich., will be received at this office until 10 a. m. (standard time), Sept. 30, 1903, and then publicly opened. Information furnished on application. W. H. BIXBY, Major, Engrs. Sept. 24.

Two Steamers for Sale.

Steamers Russell Sage and John C. Gault, 1200 tons capacity, with complete fit-out for grain and package freight. Inland Lloyds rating A 2. Engines triple Compound, and two marine boilers in each boat in fair condition. For particulars address A. W. Colton, Toledo, Ohio. Sept. 24

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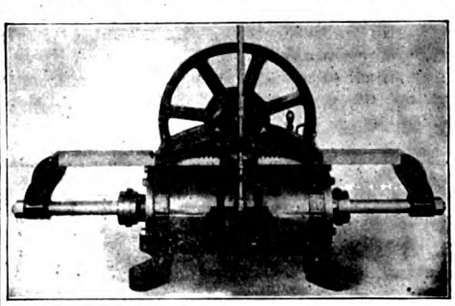

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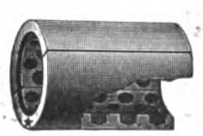

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CARGO HOISTERS

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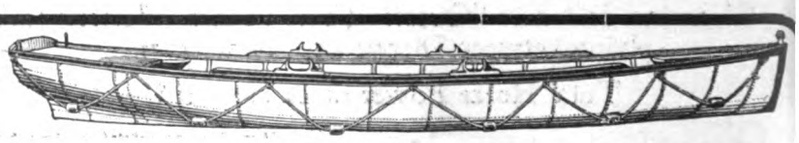
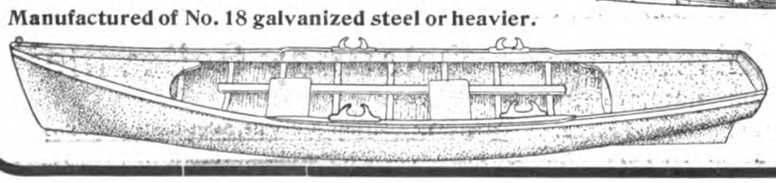
Stand Government Inspection.

Manufactured of No. 18 galvanized steel or heavier.





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A NEW HARDWOOD FROM CUBA.

Sabicu is the name of a hardwood grown in Cuba, which is coming into favor with ship builders and others who desire a wood combining strength, beauty of grain and susceptibility of a high finish. In color Sabicu resembles mahogany, and it is claimed it will not grow dark from age as that wood does. It also differs from mahogany in grain and hardness, its grain being closer and much interwoven, showing a handsome figure when finished. Being harder, it is also heavier than mahogany, but, it is claimed, the difference in weight is more than overcome in favor of Sabicu, as on account of its superior strength it can be used one-half the thickness of mahogany and yet stand more strain. It is also claimed that on account of its long interwoven grain it does not give off splinters when broken, and hence is safer than other hardwoods heretofore used in woodwork on ships, and especially on war vessels, as besides obviating the danger from flying splinters when struck by a shell, the danger of its being set on fire from the same cause is greatly lessened. In this connection it is claimed the wood is not very inflammable, burning with slow combustion.

The Arborcultura Cubana thus describes Sabicu: "A beautiful wild tree which grows to colossal dimensions, blooms in March and April, seeds ripening in October and November; grows in sandy, stony and mountainous regions. It yields a wood which is principally used in England for ship building, where it is valued highly, being considered proof against decay. Very hard, of good weight and a fine grain, very compact and mostly meat, little sap, of cinnamon color, while the meat is very hard with fine symmetrical figure. Is similar to mahogany, but not so dark and a much finer wood, which finds employment for a variety of purposes. Boiled with alum it yields an ink of a reddish color. Sabicu is not liable to warp while drying, and on account of the density of its fiber will not shrink nor expand to any great degree by the action of moisture or dryness of the atmosphere."

The wood is highly recommended for car building as well as for woodwork on ships. It has been adopted by the British admiralty for woodwork on British war vessels, and from present indications will soon find favor with other nations for a similar purpose.

Tests for strength gave the following results: Transverse stress, on piece of Sabicu 1 by 1 in., 12 in. between supports, breaking weight 1,000 lbs. Compression, on piece 1 by 1 in., by 3 in. high, two samples, averaged 10,307 lbs. before giving way in the least. Tests have also been made for acid with the result, it is claimed, that none was found that would be injurious to or interfere in any way with polish of any kind. Sabicu logs run up to 24 in. in diameter, averaging 14 in., and are cut from 12 to 18 ft. in length. Although scarcer than mahogany, it can be shipped to the United States at the present time in 50,000-ft. lots, and in larger quantities when improved facilities in way of a new mill now building in Cuba is completed. All that has been shipped to this country so far has come from Santa Clara province, on the south coast of the island.

The wood is being introduced into the United States by Grupe & Gloeckner of Havana, Cuba, and Brooklyn, N. Y., having at the latter city a hardwood and imported woods yard at foot of 20th street. Mr. Ferdinand Worms is at present in the great lakes region in the interest of the firm.

GOV. ODELL ON ERIE CANAL.

Gov. Odell of New York, in a recent address to New York state farmers, said:

"We have an important problem before us today which is and should be of interest to every citizen—the improvement of the Erie canal. The federal government never hesitates when the expenditure of millions and millions is necessary to secure perfect navigation upon our streams, our rivers and harbors. It does not figure as a part of the transportation expenses, the cost of improvement or maintenaance of our waterways, but it is contented if there shall follow a development in the states which adds to the wealth and employment of the people. So, too, in the consideration of this important problem, if you are satisfied that commerce will follow, if factories and furnaces will come to give employment to our people, then, in the interest of the state as a whole, it is your duty to authorize the expenditure which the legislature has certified to you as necessary for this purpose, leaving the question of payment for the consideration of those who have fulfilled their pledges in the past and who have promised to make provision for this expenditure, large as it is, without adding to your burden of local taxation."

TRADE NOTES.

The Atlantic Works, Incorporated, Philadelphia, Pa., has just filled an order from William G. Abbott, Milford, Del., for a bevel band saw machine for ship yard work.

The Fairbanks Co. of Baltimore, Md., have just succeeded in placing an order to supply the United States government with the Durable Wire Rope Co.'s special durable wire tiller rope (government standard), for ten new torpedo boat destroyers.

The Thomas H. Dallett Co. of Philadelphia, recently incorporated, proposes to go into the manufacture of pneumatic tools. The company has a plant at York street and Sedgley avenue, to which improvements are to be made. The following are the company officers: President, Thomas H. Dallett; vice-president and general manager, Ernest C. Bliss; secretary and treasurer, E. C. Clay. W. H. Van Sickel, formerly of New York, will be superintendent. The company will continue to manufacture belt and electrically driven portable drills and deck planers.

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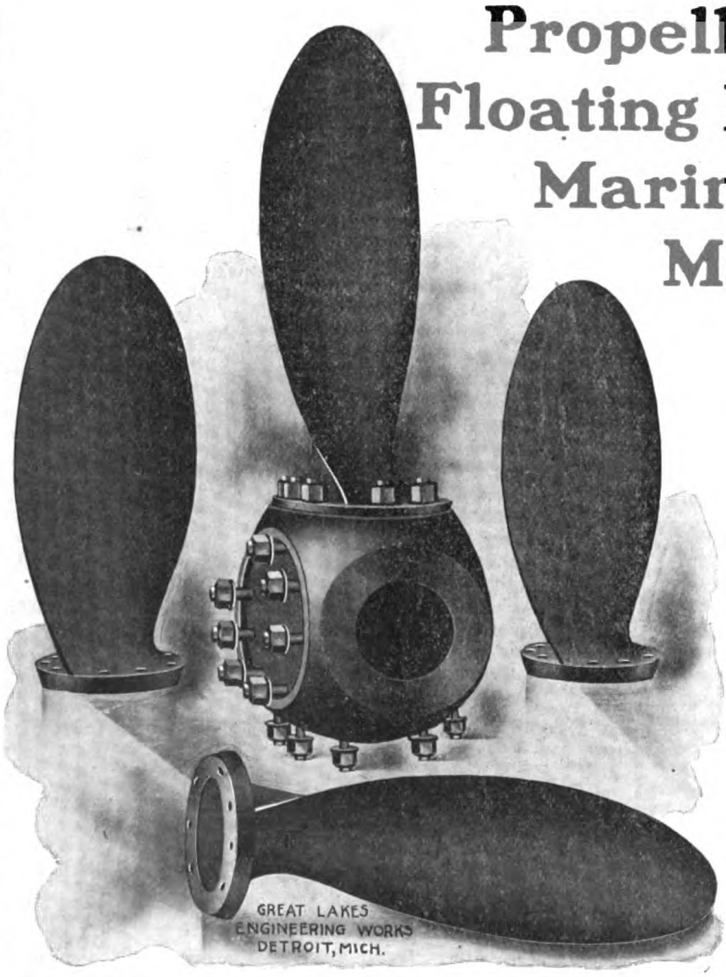

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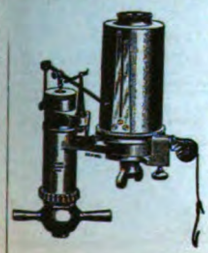

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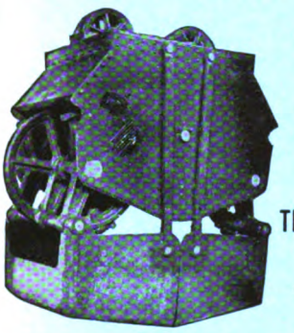

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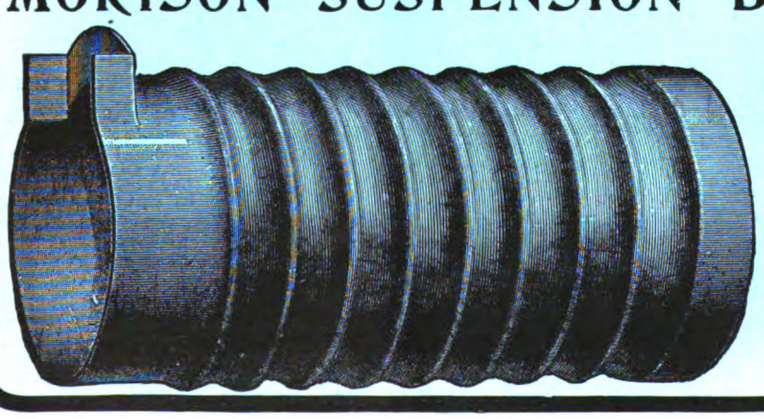

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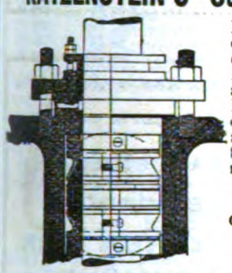

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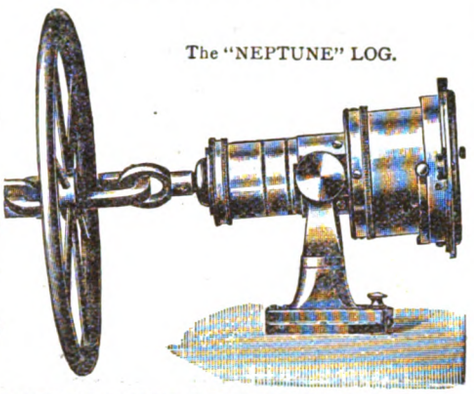

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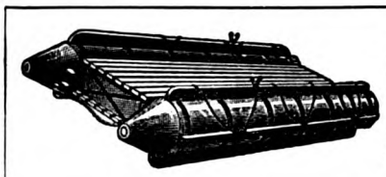

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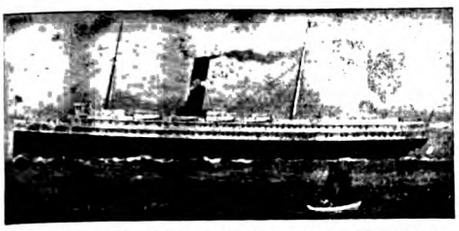

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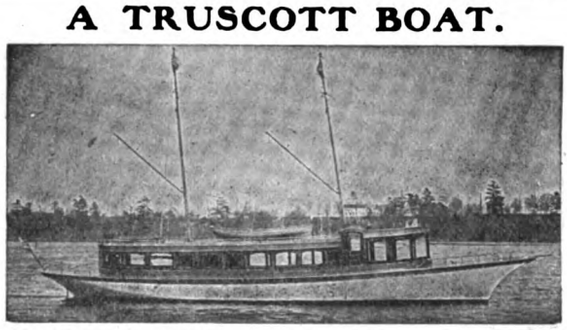

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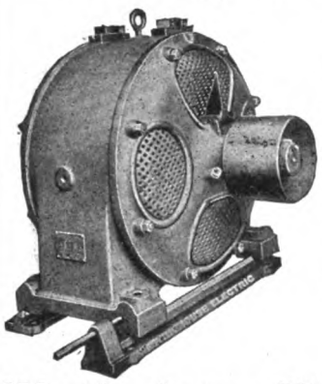

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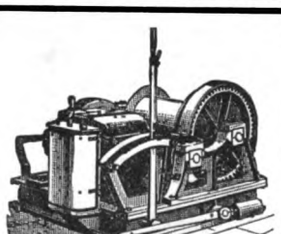

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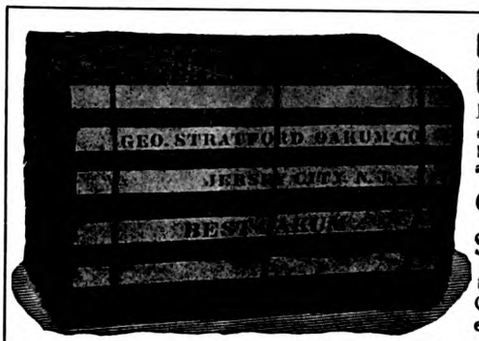

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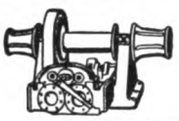

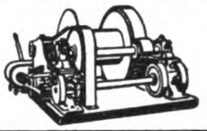

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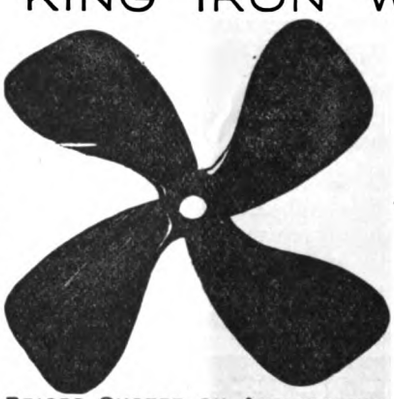

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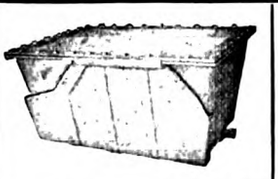

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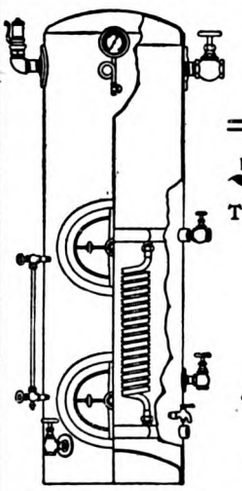

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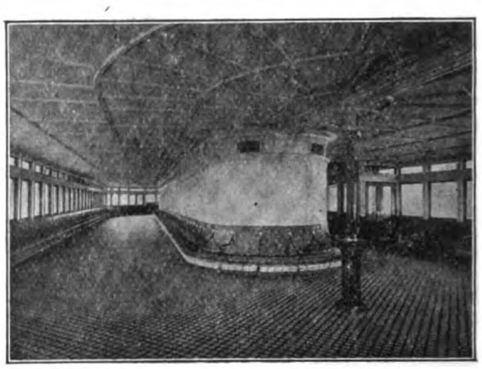

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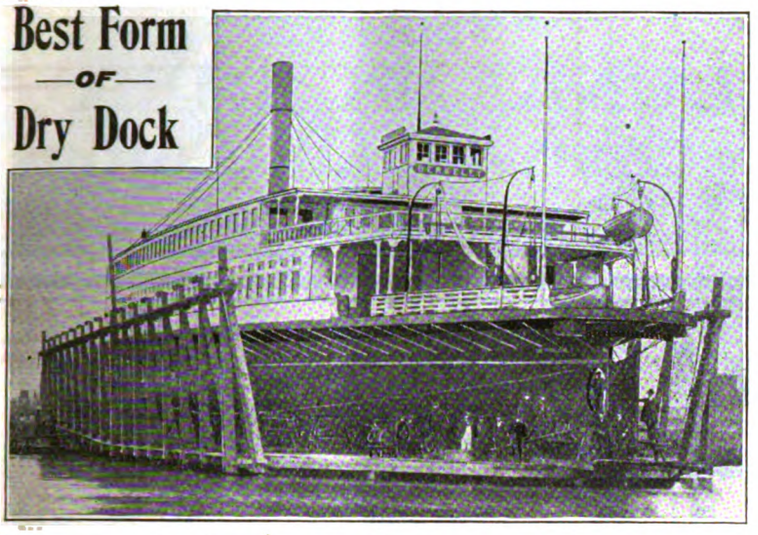

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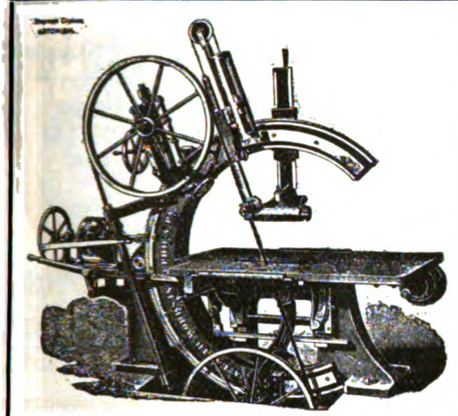

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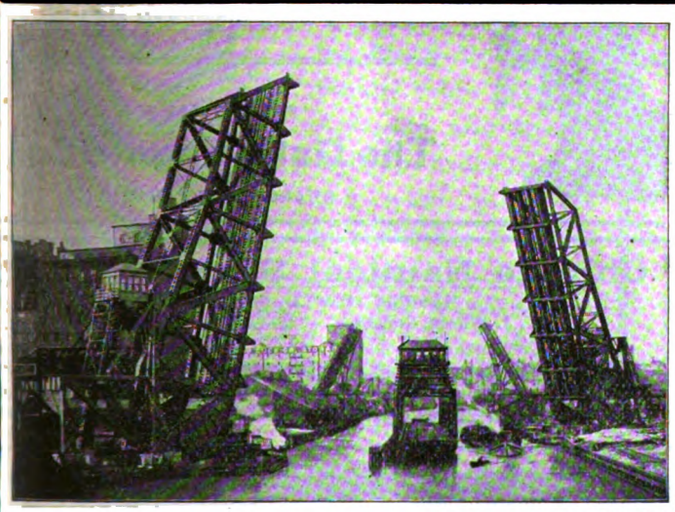

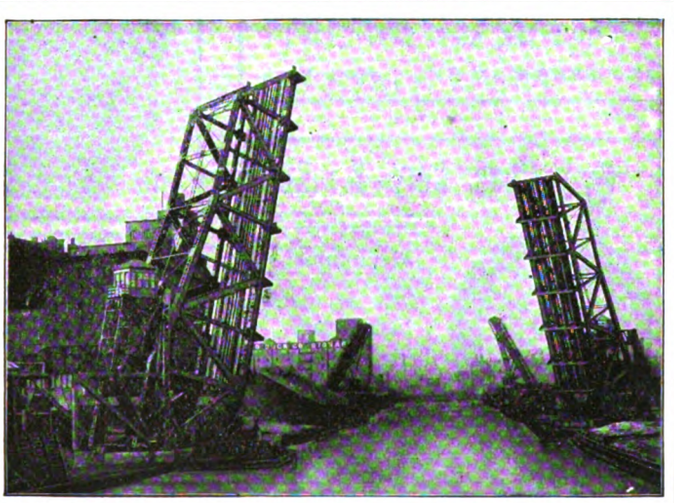

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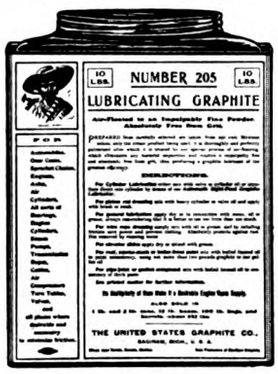

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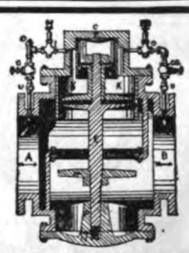

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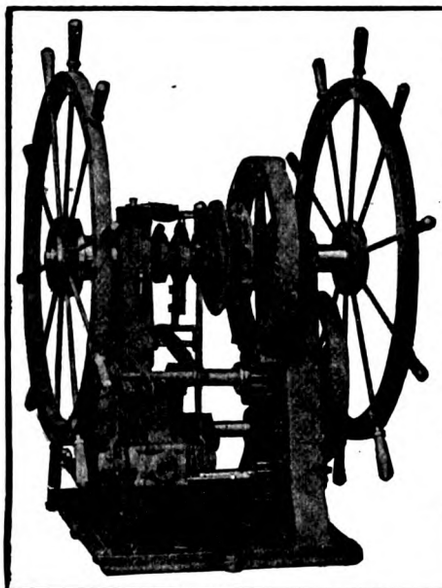

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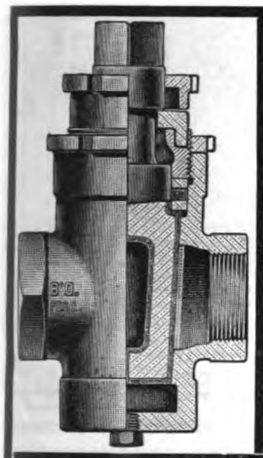

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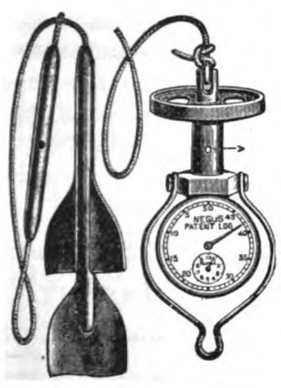

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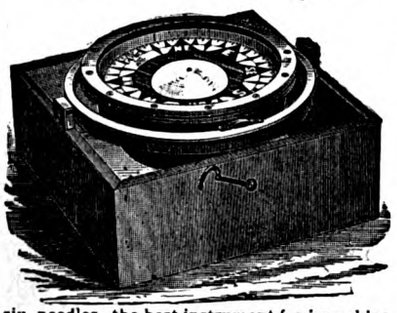

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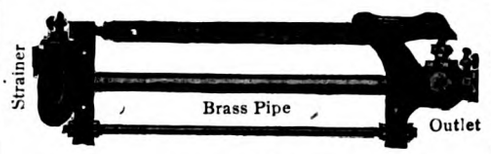

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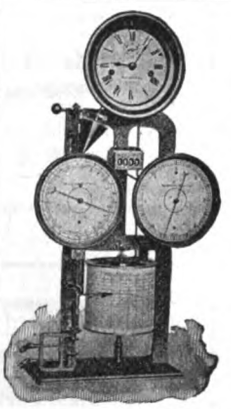

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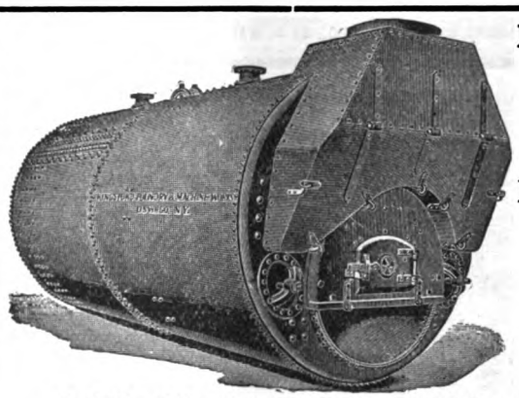

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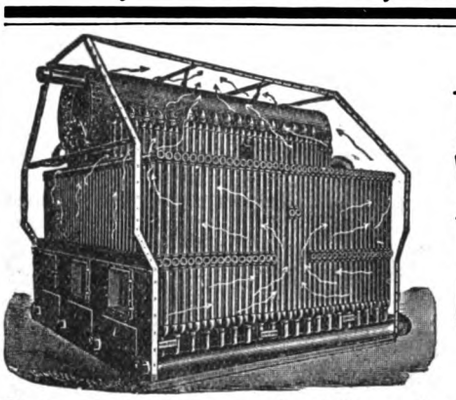

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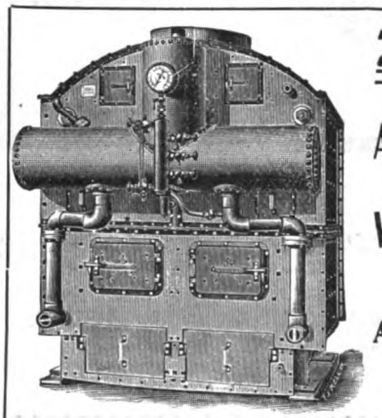

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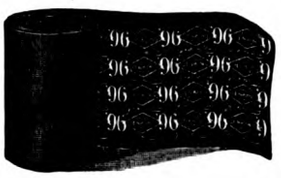

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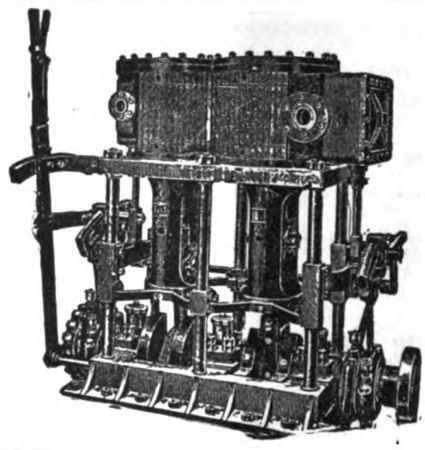

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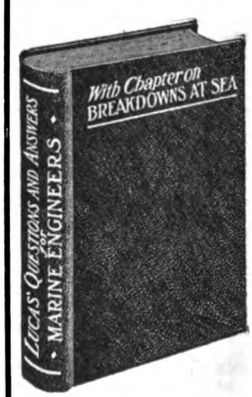

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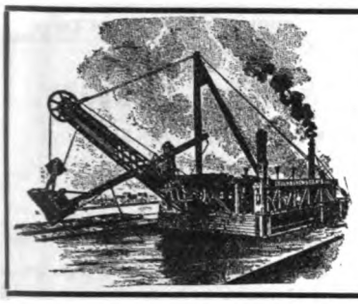

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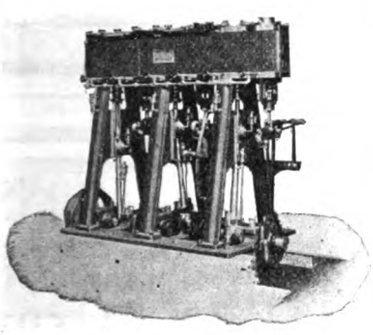

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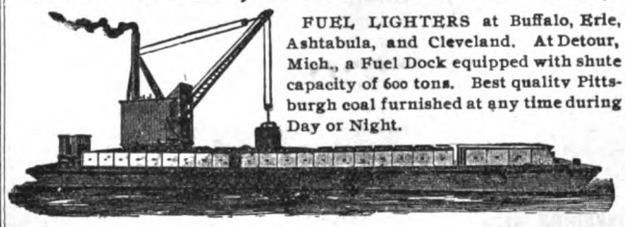

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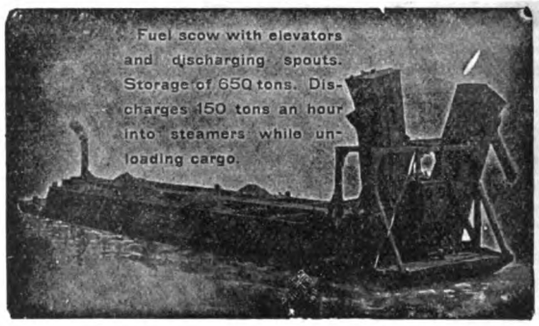
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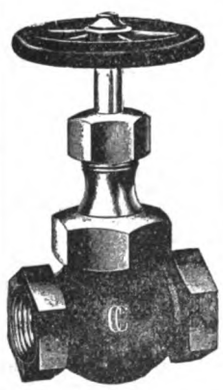

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FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co.....Cleveland.
Fore River Ship & Engine Co.....Quincy, Mass.
Macbeth Iron Co.....Cleveland.

FLUE WELDING.

Fix's, S. Sons .....Cleveland.

FURNACES FOR BOILERS.

Continental Iron Works.....New York

FUELING COMPANIES AND COAL DEALERS.

Hanna, M. A. & Co.....Cleveland.
Ironville Dock & Coal Co .....Toledo, O.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.
Rochester & Pittsburg Coal & Iron Co.....Buffalo.
Smith, Stanley B. & Co.....Detroit.
Smith Coal & Dock Co., Stanley B.....Toledo, O.
Youghiogheny & Lehigh Valley Coal Co....Chicago.

GASKETS, RUBBER.

New York Belting & Packing Co.....New York.

GAS BUOYS.

Safety Car Heating & Lighting Co.....New York

GAS AND GASOLINE ENGINES.

Chase Machine Co.....Cleveland.

GAUGES, STEAM AND VACUUM.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.
Lunkenheimer Co.....Cincinnati.

GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.
United States Graphite Co.....Saginaw, Mich.

HAMMERS, PNEUMATIC.

Chicago Pneumatic Tool Co. .....Chicago.

HAMMERS, STEAM.

Chase Machine Co.....Cleveland.

HATCH GEARS.

"Long-Arm" System Co. .....Cleveland.

HEATING APPARATUS.

Sturtevant, B. F. Co.....Boston.

HOISTS FOR CARGO, ETC.

American Ship Building Co.....Cleveland.
Brown Hoisting Machinery Co., (Inc.)....Cleveland.
Chase Machine Co.....Cleveland.
Elwell-Parker Electric Co.....Cleveland.
General Electric Co. .....New York.
Hyde Windlass Co.....Bath, Me.
Lidgerwood Mfg. Co.....New York.
Marine Iron Co.....Bay City, Mich.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

HOSE FITTINGS.

Farnan Brass Works.....Cleveland.

HOSE, RUBBER.

New York Belting & Packing Co.....New York.

HYDRAULIC DREDGES.

Great Lakes Engineering Works .....Detroit.

HYDRAULIC TOOLS.

Watson-Stillman Co., The.....New York.

ICE MACHINERY.

American Linde Refrigerating Co.....New York.
Roelker, H. B. .....New York.

INDICATORS FOR STEAM ENGINES.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.

INJECTORS.

American Injector Co.....Detroit.
Crane Co.....Chicago.
Jenkins Bros. .....New York.
Lunkenheimer Co.....Cincinnati.
Penberthy Injector Co. .....Detroit, Mich.

INSURANCE, MARINE.

Brown & Co. .....Buffalo.
Elphicke, C. W. & Co.....Chicago.
Fleming & Co., P. H. .....Chicago.
Hawgood & Co., W. A. .....Cleveland.
Helm & Co., D. T. .....Duluth.
Hutchinson & Co. .....Cleveland.
McCarthy, T. R. .....Montreal.
McCurdy, Geo. L. .....Chicago.
Mitchell & Co. .....Cleveland.
Peck, Chas. E. & W. F. ..New York and Chicago.
Richardson, W. C. .....Cleveland.
Sullivan, D. & Co.....Chicago.
Weeks, F. H. .....New York.

IRON ORE AND PIG IRON.

Bourne-Fuller Co. .....Cleveland.
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Marine Construction & D. D. Co.....
.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Warrington Iron Works.....Chicago.
Willard, Chas. P. .....Chicago.

LIFE FLOATS.

Carley Life Float Co. .....New York.

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong Cork Co. .....Pittsburg.
Carley Life Float Co.....New York
Drein, Thos. & Son .....Wilmington, Del.
Kahnweiler's Sons, D. .....New York.
Lane & DeGroot .....Long Island City, N. Y.
Marine Construction & Dry Dock Co.....
.....Mariner's Harbor, S. I., N. Y.
Rippley Hardware Co .....Grafton, Ill.

LIGHTS, SIDE AND SIGNAL.

Helvig, H. A. J. .....New York.
Russell & Watson .....Buffalo.

LOGS.

Bliss, John & Co.....New York.
Negus, T. S. & J. D. .....New York.
Nicholson Ship Log Co. .....Cleveland.
Walker & Sons, Thomas .....Birmingham, Eng.
Also Ship Chandlers.

LUBRICATING GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.
United States Graphite Co .....Saginaw, Mich.

LUMBER.

Martin-Barriss Co. .....Cleveland.
Moran Bros. Co.....Seattle, Wash.
Shurick, F. S. .....New York.

MACHINISTS.

Chase Machine Co.....Cleveland.
Lockwood Mfg Co .....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Union Machine & Boiler Co. .....Cleveland.

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc. .....Philadelphia.

MAN-HOLES, SWING DOORS, ETC.

"Long-Arm" System Co. .....Cleveland.

MARINE RAILWAYS, BUILDERS OF

Crandall & Son, H. I. .....East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W. .....New York.

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.
Bloomsburg & Co., H. .....Baltimore, Md.
Detroit Ship Building Co.....Detroit.
Sturtevant, B. F. Co.....Boston.

METALLIC PACKING.

Hayden Mfg. Co., N. L. .....Columbus, O.
Katzenstein, L. & Co. .....New York.
U. S. Metallic Packing Co. .....Philadelphia.

METAL POLISH.

Bertram's Oil Polish Co.....Boston.

MOTORS, GENERATORS—ELECTRIC.

Electro-Dynamic Co.....Philadelphia.
Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
"Long-Arm" System Co. .....Cleveland.
Sturtevant, B. F. Co.....Boston
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

NAUTICAL INSTRUMENTS.

Bliss, John & Co. .....New York.
Negus, T. S. & J. D. .....New York
Ritchie, E. S. & Sons .....Brookline, Mass.

NAUTICAL SCHOOLS.

Chicago Nautical School. .....Chicago.
Seattle Nautical School .....Seattle, Wash.

NAVAL ARCHITECTS.

Gaskin, Edward .....Buffalo.
Kidd, Joseph .....Duluth, Minn
Logan, Robert .....Cleveland.
Matteson & Drake.....Philadelphia.
Mosher, Chas. D.....New York.
Newman, R. L. .....New York
Sadler, Perkins & Field .....New York.
Wood, W. J. .....Chicago.

OAKUM.

DeGrauw, Aymar & Co. .....New York.
Stratford Oakum Co. .....Jersey City, N. J.

OIL FOR PAINTING.

Sipe & Co., James B .....Allegheny, Pa

OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph .....Jersey City, N. J.
Standard Oil Co. .....Cleveland.
United States Graphite Co .....Saginaw, Mich.

PACKING.

Crane Co. .....Chicago.
Hayden Mfg. Co., N. L. .....Columbus, O.
Jenkins Bros. .....New York.
Katzenstein, L. & Co. .....New York.
New York Belting & Packing Co. .....New York.
United States Metallic Packing Co...Philadelphia.

PAINTS.

Baker, Howard H. & Co.....Buffalo.
Berry Bros., Ltd. .....Detroit.
Detroit Varnish Co. .....Detroit.
Detroit White Lead Works .....Detroit.
Mohawk Paint & Chemical Co.....Norwich, Conn.
New Jersey Zinc Co. .....New York.
Sipe & Co., James B.....Allegheny, Pa.
United States Graphite Co.....Saginaw, Mich.
Upson-Walton Co. .....Cleveland.

PATENT ATTORNEYS.

Thurston & Bates .....Cleveland.

PATTERN SHOP MACHINERY.

Atlantic Works, Inc. .....Philadelphia.

PIPE—BRASS AND COPPER, IRON PIPE SIZE.

Waterbury Brass Co. .....New York.

PIPE-JOINT COMPOUND.

United States Graphite Co .....Saginaw, Mich.

PIPE, WROUGHT IRON.

Bourne-Fuller Co. .....Cleveland.
Crane Co. .....Chicago.
Macbeth Iron Co.....Cleveland.

PLANING MILL MACHINERY.

Atlantic Works, Inc. .....Philadelphia.

PLATES—SHIP, STRUCTURAL, ETC.

Bourne-Fuller Co .....Cleveland.

PLUMBING, MARINE.

Reilly Repair & Supply Co., James....New York
Sands, Alfred B. & Son.....New York.

PNEUMATIC TOOLS.

Allen, John F. .....New York.
Chicago Pneumatic Tool Co. .....Chicago.

POLISH FOR METALS.

Bertram's Oil Polish Co.....Boston.

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BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

POWER DOORS AND HATCHES.

"Long-Arm" System Co.....Cleveland.

PRESSURE REGULATORS.

Kieley & Mueller .....New York.
Ross Valve Co. .....Troy, N. Y.

PROPELLER WHEELS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Bath Iron Works, Ltd.....Bath, Me.
Cramp, Wm. & Sons.....Philadelphia.
Crescent Ship Yard Co.....Elizabethport, N. J.
Detroit Ship Building Co.....Detroit.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Hyde Windlass Co. .....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co.....Seattle, Wash.
Neafie & Levy Ship & Engine Building Co....Phila.
Newport News Ship Building Co Newport News, Va.
Phosphor Bronze Smelting Co., Ltd. ..Philadelphia.
Risdon Iron Works.....San Francisco.
Roelker, H. B. .....New York.
Sheriffs Mfg. Co. .....Milwaukee.
Superior Shipbuilding Co ..... Superior, Wis.
Thropp & Sons Co., J. E. .....Trenton, N. J.
Trout, H. G. .....Buffalo.
United States Ship Building Co.....New York.

PROJECTORS, ELECTRIC.

Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F., Mfg. Co.....New York.
Great Lakes Engineering Works.....Detroit.
Kingsford Foundry & Machine Wks. Oswego, N. Y.
"Long-Arm" System Co.....Cleveland.

PUNCHES, RIVETERS, SHEARS.

Allen, John F.....New York.
Chicago Pneumatic Tool Co. .....Chicago.

REFRIGERATING APPARATUS.

Roelker, H. B. .....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register .....Cleveland
Record of American & Foreign Shipping.New York.

RELEASING HOOKS FOR DETACHING BOATS.

Standard Automatic Releasing Hook Co. New York

RIVETING MACHINES.

Allen, John F .....New York.
Chicago Pneumatic Tool Co. .....Chicago.

RIVETS, STEEL, FOR SHIPS AND BOILERS.

Bourne-Fuller Co. .....Cleveland.

RANGES.

Russell & Watson .....Buffalo.

RIVETS—BRASS AND COPPER.

Waterbury Brass Co. .....New York.

SAFETY VALVES.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Crane Co ..... Chicago.
Hayden Mfg. Co., N. L. .....Columbus, O.
Lunkenheimer Co.....Cincinnati.

SAIL MAKERS.

Baker, Howard H. & Co. .....Buffalo.
Upson-Walton Co. .....Cleveland.
Wilson & Silsby .....Boston.

SALVAGE COMPANIES.

See Wrecking Companies.

SCHOOLS, NAUTICAL.

Chicago Nautical School..... Chicago.
Seattle Nautical School.....Seattle, Wash.

SEARCH LIGHTS.

Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

SHEARS.

See Punches, Rivets, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co. .....Cleveland.

SHIP BUILDERS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Bath Iron Works, Ltd.....Bath, Me.
Buffalo Dry Dock Co.....Buffalo.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Chicago Ship Building Co.....Chicago.
Crescent Ship Yard Co.....Elizabethport, N. J.
Detroit Ship Building Co. .....Detroit.
Fore River Ship & Engine Co. .....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co. .....Manitowoc, Wis.
Marine Construction & Dry Dock Co.....
.....Mariner's Harbor, S. I., N. Y.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co.....Seattle, Wash.
Neafie & Levy Ship & Engine Building Co....Phila.
Newport News Ship Building Co Newport News, Va.
Risdon Iron Works.....San Francisco.
Roach's Ship Yard .....Chester, Pa.
Shipowners Dry Dock Co. .....Chicago.
Smith & Son, Abram .....Algonac, Mich.
United States Ship Building Co.....New York.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

SHIP CHANDLERS.

Baker, Howard H. & Co. .....Buffalo.
Moran Bros. Co.....Seattle, Wash.
Reilly Repair & Supply Co., James....New York.
Upson-Walton Co. .....Cleveland.

SHIP LANTERNS AND LAMPS.

Helvig, H. A. J. .....New York.
Russell & Watson .....Buffalo.

SHIP TIMBER.

Martin-Barriss Co. .....Cleveland.
Moran Bros. Co.....Seattle, Wash.
Shurick, F. S. ..... New York.

SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co. .....Jersey City, N. J.

SPARS—LARGE SIZES.

Moran Bros. Co.....Seattle, Wash.

STAYBOLTS, IRON OR STEEL, HOLLOW, OR, SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

STEAM VESSELS FOR SALE.

Elwell, Jas. W. & Co. .....New York.
Holmes, Samuel .....New York.
King, Rufus S. .....New York.
McCarthy, T. R. .....Montreal, Can.
Newman, R. L. .....New York.
Weeks, F. H. .....New York.

STEAMSHIP LINES, PASS. AND FREIGHT.

American Line .....New York.
Cleveland & Buffalo Transit Co. .....Cleveland.
Erie & Western Trans. Co. .....Buffalo.
Goodrich Trans. Co. .....Chicago.
International Mercantile Marine Co . Philadelphia.
Pere Marquette R. R. & S. S. Line.....Milwaukee.
Red Star Line .....New York.

STEEL CASTINGS.

Seaboard Steel Casting Co. .....Chester, Pa.
Macbeth Iron Co.....Cleveland.

STEERING APPARATUS.

American Ship Building Co.....Cleveland.
Chase Machine Co.....Cleveland.
Dake Engine Co. .....Grand Haven, Mich.
Detroit Ship Building Co.....Detroit.
Electro-Dynamic Co.....Philadelphia.
Hyde Windlass Co. .....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Sheriffs Mfg. Co. .....Milwaukee.

STOCKS, BONDS, SECURITIES.

Fahey & Co. .....Cleveland.

SUBMARINE DIVING APPARATUS.

Morse & Son, A. J. .....Boston.
Schrader's Son, A. .....New York.

SURVEYORS, MARINE.

Gaskin, Edward .....Buffalo.
Matteson & Drake ..... Philadelphia.
Newman, R. L. .....New York.
Wood, W. J. .....Chicago.

TESTS OF MATERIALS.

Hunt, Robert W. & Co. .....Chicago.
Pittsburg Testing Laboratory Ltd. .....Pittsburg.

TILING, INTERLOCKING RUBBER.

New York Belting & Packing Co. .....New York.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Allen, John F. .....New York.
Chicago Pneumatic Tool Co.....Chicago.
Watson-Stillman Co. .....New York.

TOOLS, WOOD WORKING.

Atlantic Works, Inc. .....Philadelphia.

TOWING MACHINES.

American Ship Windlass Co.....Providence, R. I.
Chase Machine Co. .....Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co....Kingston, Ont.
Midland Towing & Wrecking Co., Ltd.Midland, Ont.

TRAPS, STEAM.

Kieley & Mueller .....New York.
Lunkenheimer Co. ..... Cincinnati.
Sturtevant Co., B F, Jamaica Plain. .....Boston.

TRUCKS.

Boston & Lockport Block Co. .....Boston.

TUBING, SEAMLESS.

Shelby Steel Tube Co. .....Pittsburg, Pa.
Waterbury Brass Co.....New York.

VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Bordo, L. J. .....Philadelphia.
Crane Co. .....Chicago.
Hayden Mfg. Co., N. L. .....Columbus, O.
Jenkins Bros. .....New York.
Kieley & Mueller .....New York.
Lunkenheimer Co. ..... Cincinnati.
Ross Valve Co. .....Troy, N. Y.

VALVES FOR WATER AND GAS.

Ross Valve Co. .....Troy, N. Y.

VARNISHES.

Berry Brothers, Ltd. .....Detroit.
Detroit Varnish Co..... Detroit.
Detroit White Lead Works..... Detroit.
New Jersey Zinc Co.....New York.
Also Ship Chandlers.

VESSEL AND FREIGHT AGENTS.

Boland, John J. .....Buffalo.
Brown & Co. .....Buffalo.
Elwell, Jas. W. & Co. .....New York.
Elphicke, C. W. & Co. .....Chicago.
Fleming & Co., P. H. .....Chicago.
Hall & Root .....Buffalo.
Helm & Co., D. T. .....Duluth.
Hawgood & Co., W. A. .....Cleveland.
Holmes, Samuel .....New York.
Hutchinson & Co. .....Cleveland.
King, Rufus S. .....New York.
McCarthy, T. R. .....Montreal.
Newman, R. L. .....New York.
Mitchell & Co. ..... Cleveland
Richardson, W. C. .....Cleveland.
Sullivan, D. & Co. .....Chicago.
Weeks, F. H. .....New York.

VENTILATING APPARATUS FOR SHIPS.

Sturtevant, B. F. Co. .....Boston.

WIRE—BRASS AND COPPER.

Waterbury Brass Co. .....New York.

WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co. .....Buffalo.
DeGrauw, Aymar & Co. .....New York.
Upson-Walton Co. .....Cleveland.

WHISTLES, STEAM.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Lunkenheimer Co. ..... Cincinnati.

WHITE METAL—SHEETS, RODS AND WIRE.

Waterbury Brass Co. .....New York.

WINDLASSES.

American Ship Windlass Co.....Providence, R. I.
American Ship Building Co. .....Cleveland.
Hyde Windlass Co. .....Bath, Me.
Jenks Ship Building Co. .....Port Huron, Mich.

WINCHES.

American Ship Windlass Co.....Providence, R. I.
Hyde Windlass Co. .....Bath, Me.

WOOD WORKING MACHINERY.

Atlantic Works, Inc. .....Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co...Kingston, Ont.
Midland Towing & Wrecking Co., Ltd..Midland, Ont.

YACHT AND BOAT BUILDERS.

Dreln, Thos. & Son .....Wilmington, Del.
Lane & DeGroot .....Long Island City, N. Y.
Marine Construction & Dry Dock Co.....New York.
Rippley Hardware Co..... Grafton, Ill.
Truscott Boat Mfg Co.....St. Joseph, Mich.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

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Dreln, Thos. & Son .....Wilmington, Del.
Lane & DeGroot.....Long Island City, N. Y.

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Risdon Iron Works 5
*Ritchie & Sons, E. S..... 13

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No. 20, Chi & Cleve Ex....	*7:20am	.....
No. 28, N Y & Bost Ex	*7:40am	*8:00am
No. 40, Toledo & Buff Ac.	†10:00am	†10:40am
No. 32, Fast Mail	*11:25am	*11:30am
No. 44, Ac via Sandusky..	†1:40pm	..
No. 46, Southwestern Ex.	....	*3:00pm
No. 116, Conneaut Accom	....	†4:30pm
No. 6, Lim Fast Mail....	*5:40pm	*5:45pm
No. 26, 20th Cent Lim. ...	*7:40pm	*7:43pm
No. 10, C., N Y & B Sp....	*7:30pm	*7:50pm
No. 16, New Eng Ex.....	*10:30pm	*10:35pm
No. 2, Day Express.	†9:10pm	†9 25pm
No. 126, Norwalk Accom.	†7:40am	.....

Westward.	Arrive from East.	Depart West.
No. 11, Southwestern Lim	*3:25am	....
No. 7, Day Express.	.....	†6:00am
No. 15, Bost & Chi Sp.....	*3:53am	*3:15am
No. 19, Lake Shore Lim..	*7:00am	*7:15 m
No. 23, Western Express.	*10:30am	*10:35am
No. 29, Southwestern Ex.	‡11:10am	.....
No. 33, Southwestern Ex	*12:25pm	.....
No. 133, Cleve & Det Ex..	.... ..	*12:45p m
No. 47 Accomodation.....	†11.0.am	†3:00pm
No. 141, Sandusky Accom.	....	†3:10pm
No. 43, Fast Mail ..	*4:35pm	*4:40pm
No. 127, Norwalk Accom..	....	†5:10pm
No. 37 Pacific Express...	*7:00pm	*7:20pm
No. 3, Fast Mail Lim.....	*10:50pm	*10:55pm
No. 115, Conneaut Accom.	*8:30am	.....

*Daily. †Except Sunday. ‡Except Monday.
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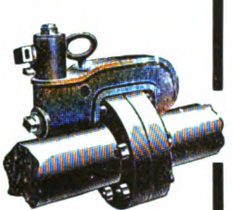

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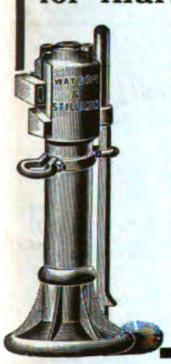

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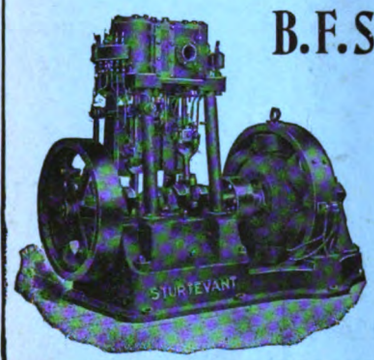

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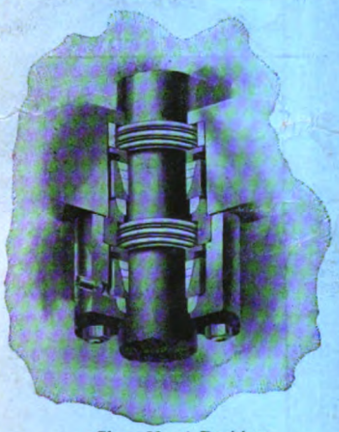

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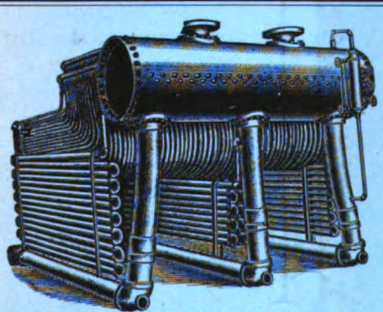

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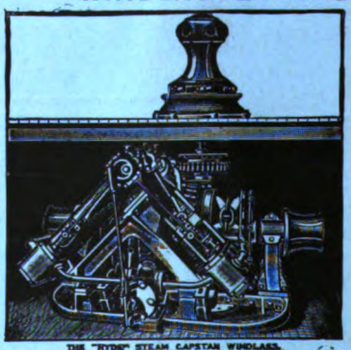

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